



Levin-Richmond Terminal Corporation

402 Wright Avenue, Richmond, California 94804

Tel. (510) 307-4000 / Fax. (510) 236-0129

September 23, 2020

Ms. Karen Jurist
United States Environmental Protection Agency Region 9
75 Hawthorne Street
San Francisco, California 94105
Via email: jurist.karen@epa.gov

RE: 2019-2020 Annual Report, United Heckathorn Superfund Site, Upland Capping System
Richmond, California

Dear Ms. Jurist:

Enclosed please find the 2019-2020 Annual Report for the Upland Capping System at the United Heckathorn Superfund Site.

Please feel free to contact me if you have any questions or concerns with the attached report.

Sincerely,

Jim Holland

Vice President of Facilities, Equipment, and Environmental Officer
Levin Richmond Terminal Corporation
(510) 307-4076

Enclosure: 2019-2020 Annual Report for United Heckathorn Superfund Site Upland Capping System



2019-2020 Annual Report

**United Heckathorn Superfund Site
Upland Capping System
Richmond, California**

September 8, 2020
Rev. 0

prepared for:

Levin Richmond Terminal Corporation
402 Wright Avenue
Richmond, California 94804

prepared by:

CDIM Engineering, Inc.
45 Polk Street, 3rd Floor
San Francisco, California 94102



2019-2020 Annual Report

**United Heckathorn Superfund Site
Upland Capping System
Richmond, California**

September 8, 2020
Rev. 0

prepared by:

CDIM Engineering, Inc.
45 Polk Street, 3rd Floor
San Francisco, CA 94102

CDIM's work for the Levin Richmond Terminal Corporation was conducted under my supervision. To the best of my knowledge, the data contained herein are true and accurate, are based on what can be reasonably understood as a result of this project, and satisfy the scope of work prescribed by the client for this project. The data, findings, recommendations, specifications, or professional opinions were prepared solely for the use of the Levin Richmond Terminal Corporation in accordance with generally accepted professional engineering and geologic practice. We make no other warranty, either expressed or implied, and are not responsible for the interpretation by others of the contents herein.



A handwritten signature in blue ink that reads "Scott Bourne".

Scott Bourne, PE #C72817
Principal Engineer

September 8, 2020

Date

TABLE OF CONTENTS

1	INTRODUCTION	1
1.1	Background	1
1.2	Program Objectives	2
1.3	Operation and Maintenance Program	2
1.4	Contents of this Report	2
2	SITE DESCRIPTION	3
2.1	Upland Area Description and Current Use	3
2.2	Nearby Water Bodies	3
2.3	Upland Area Cap	3
2.4	Storm Water Collection and Advanced Treatment	3
3	OPERATION AND MAINTENANCE	5
3.1	Upland Cap Maintenance	5
3.2	Storm Water Collection System Inspection and Cleaning	5
3.3	Storm Water Monitoring	5
3.3.1	<i>Storm Water Sampling</i>	6
3.3.2	<i>Sample Results</i>	6
3.3.3	<i>Quality Assurance/Quality Control</i>	7
3.3.4	<i>Assessment of Results</i>	7
3.4	Storm Water Treatment System Operation	7
3.5	Sheet Pile Seep Sampling	8
3.5.1	<i>Seep Observations, Sampling, and Irrigation Repair</i>	8
3.5.2	<i>Seep Results and Discussion</i>	8
3.5.3	<i>Response Action</i>	9
4	ANNUAL SITE INSPECTION	10
4.1	Concrete Cap Inspection	10
4.2	Gravel Cover Inspection	10
4.3	Triennial Upland Cap Survey	11
5	PROPOSED SITE WORK FOR 2020-2021	12
6	CONCLUSIONS AND RECOMMENDATIONS	13
7	REFERENCES	14

TABLES

Table 1	2019-2020 Annual Storm Water Sampling Data for Pesticides
Table 2	2019-2020 Annual Storm Water Sampling Data for General Parameters and Metals
Table 3	Seep Sample Results for Pesticides
Table 4	Seep Pesticide Mass Discharge Estimate
Table 5	Proposed Site Work for 2020-2021

FIGURES

Figure 1	Site Location Map
Figure 2	Site Layout
Figure 3	Upland Capping System Details
Figure 4	Seep Location
Figure 5	Total DDT in Stormwater, 2015-2020, Treatment System TS-2
Figure 6	Dieldrin in Stormwater, 2015-2020, Treatment System TS-2

APPENDICES

Appendix A	Upland Capping System Inspection Photographs
Appendix B	Laboratory Analytical Reports
Appendix C	Upland Capping System Inspection Form
Appendix D	Upland Cap Survey Plat

ACRONYMS AND ABBREVIATIONS

BMP	best management practices
CDIM	CDIM Engineering, Inc.
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethene
DDT	dichlorodiphenyltrichloroethane
EPA	United States Environmental Protection Agency
gpm	gallons per minute
Heckathorn Site or Site	United Heckathorn Superfund Site
IGP	Storm Water Industrial General Permit
LRT	Levin Richmond Terminal
LRTC	Levin Richmond Terminal Corporation
MDL	method detection limit
msl	mean sea level
mS/cm	milliSiemen per centimeter
NAL	numeric action level
NPDES	National Pollutant Discharge Elimination System
O&G	oil and grease
O&M	operations and maintenance
O&M Plan	Revised Draft Operations and Maintenance Plan, Upland Capping System, Former United Heckathorn Site
pg/L	picograms per liter
QSE	Qualified Storm Event
ROD	Record of Decision
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resource Control Board
Third Five-Year Review	Third Five-Year Review Report for United Heckathorn Superfund Site, Richmond, California
TS-2	advanced storm water treatment system TS-2
TSS	total suspended solids

1 INTRODUCTION

On behalf of the Levin Richmond Terminal Corporation (LRTC), CDIM Engineering, Inc. (CDIM) has prepared this 2019-2020 Annual Report to describe the inspection, monitoring, and maintenance performed on the upland cap at the United Heckathorn Superfund Site (Heckathorn Site).

1.1 Background

From 1947 through 1966, the Heckathorn Site was used for formulating, processing, packaging, and shipping pesticides including aldrin, dichlorodiphenyltrichloroethane (DDT), dieldrin, and endrin. These activities resulted in the release of pesticides to the surrounding soils and the Lauritzen Channel. In 1994, after remedial investigation and feasibility studies were completed, the United States Environmental Protection Agency (EPA) adopted a Record of Decision (ROD) for remedial action requiring:

- Dredging of all soft bay mud from the Lauritzen Channel and the Parr Canal, with offsite disposal of dredged material;
- Placement of clean material after dredging;
- Construction of a cap at and around the former Heckathorn facility to prevent erosion;
- A deed restriction limiting the property at the former Heckathorn facility location to non-residential uses; and,
- Marine monitoring to verify the effectiveness of the remedy (EPA, 1994b).

In 1996, LRTC entered into a Consent Decree¹ with the EPA, which outlined LRTC's responsibility to design, construct, and maintain a concrete cap at and around the former Heckathorn facility to prevent erosion (United States District Court, 1996a). LRTC completed construction of the concrete cap in July 1999 (PES, 1999b).

Since the cap was constructed, EPA has completed four five-year reviews. EPA has found the upland remedial action is functioning as intended, is protective of human health and the environment, and has met the remedial action objective for the upland area by capping of contaminated soils, which has eliminated human exposure pathways and has prevented erosion (EPA, 2016).²

¹ Montrose Chemical Corporation of California, Chris-Craft Industrial, Rhone-Poulenc, Inc. and Stauffer Management Company (collectively the "Montrose Group") entered into a separate Consent Decree with EPA for dredging of young bay mud from the Lauritzen Channel and Parr Canal, with offsite disposal of dredged material and placement of clean fill after dredging (United States District Court, 1996b).

² The 2016 Five Year Review also states (page 34) "*Another remedial action objective is to prevent the erosion and transport or upland soils into the Lauritzen Channel. Erosion is occurring only within the marine area – specifically, under the sheet pile along the Lauritzen Channel embankment; no erosion has been observed in the area of the upland cap. This RAO for the upland area has been met.*" (EPA, 2016).

1.2 Program Objectives

To ensure long-term protection of human health and the environment, the remedial action goal established by the EPA for upland and embankment soils is the prevention of erosion and transport into the Lauritzen Channel (EPA, 1994a).

The upland cap was designed to prevent the release of residual chlorinated pesticides that are present in soils (PES, 1998).

The objective of the cap inspection and storm water monitoring programs is to identify any potential release of pesticide-impacted soil by examining the integrity of the cap system through visual inspection and storm water monitoring (EPA, 2011).

1.3 Operation and Maintenance Program

LRTC performs operations and maintenance (O&M) activities in accordance with the Revised Draft Operations and Maintenance Plan, Upland Capping System, Former United Heckathorn Site (O&M Plan; PES, 1999a). LRTC performs additional O&M activities as recommended by EPA in the Third Five-Year Review Report for United Heckathorn Superfund Site, Richmond, California (Third Five-Year Review; EPA, 2011) to provide added confidence that the upland area remedy maintains its effectiveness.

1.4 Contents of this Report

This Annual Report describes activities performed by LRTC to inspect, monitor and maintain the upland cap for the period of July 1, 2019 to June 30, 2020. Included is a summary of each of the following:

- Capping system maintenance activities;
- Storm water collection system inspection and cleaning;
- Storm water system monitoring;
- Storm water treatment;
- Annual cap inspection;
- Proposed site work for 2020-2021; and,
- A conclusion with CDIM's opinion as to the overall condition and effectiveness of the cap in meeting the program objectives.

2 SITE DESCRIPTION

The Levin Richmond Terminal (LRT) is located at 402 Wright Avenue in Richmond, California and is immediately adjacent to the Lauritzen Channel in the Richmond Harbor (Figure 1). The Heckathorn Site includes the northern five acres of the Main Terminal at LRT, also known as the upland cap area (Figure 2).

2.1 Upland Area Description and Current Use

The upland cap area is bounded by a railroad track and Cutting Boulevard to the north; South Fourth Street to the east; the LRT and Santa Fe Channel to the south; and the Lauritzen Channel to the west. The majority of the upland cap area is relatively flat with surface elevations of approximately 9 feet above mean sea level (msl), with the exception of the upland cap area north of the Lauritzen Channel; this portion was raised to approximately 15 feet above msl during cap construction.

The upland cap area is used primarily for storage of dry bulk product and railroad operations. Photographs taken during the site inspection are included in Appendix A.

2.2 Nearby Water Bodies

The storm water system in the upland cap area discharges directly to the Lauritzen Channel (Figure 2). The Lauritzen Channel is connected to the San Francisco Bay via the Santa Fe Channel and Richmond Inner Harbor.

2.3 Upland Area Cap

Construction of the concrete cap at the upland cap area began in July 1998, and it was completed in July 1999 (PES, 1999b). Installation of the cap consisted of: (1) site grading to promote surface runoff to the collection points; (2) installation of a drainage system to collect surface runoff, including best management practices (BMPs) for storm water pollution prevention; and (3) construction of a reinforced concrete cap in the majority of the 5-acre area and construction of a geotextile fabric and gravel cap in the railroad track area (Figure 2). The concrete cap consists of a minimum 6-inch thick concrete section with a double layer of welded wire fabric reinforcement. The gravel cover consists of a geotextile fabric over a prepared subgrade. The geotextile fabric is covered by a 6-inch layer of gravel.

2.4 Storm Water Collection and Advanced Treatment

The facility is paved with asphalt and concrete and is graded to direct surface water runoff via sheet flow or shallow swales to drop inlets (Figure 3). The drop inlets drain to five below-grade interceptors³ (SW-3 through SW-7) via underground pipe. The interceptors are equipped with compartments and steel baffles to allow the

³ The interceptor design was based on a five-minute retention time during a 10-year, 24-hour storm event (PES, 1999a).

settling of sediments and separation of oil/grease and floatables. Each interceptor is also equipped with normally-closed gate valves at the effluent pipe, which can be opened during heavy rains to enable direct discharge to the Lauritzen Channel.

In 2015, LRTC modified⁴ the upland cap area storm water collection system and installed an advanced storm water treatment system TS-2 (TS-2). Single-speed submersible pumps placed into the final chamber of each interceptor were connected to newly installed storm drain pipe along the edge of the LRTC pier. During storm events, the submersible pumps push storm water captured by interceptors SW-3 to SW-7 through an inline static mixer where a biopolymer flocculant is added. Storm water then flows into a series of two 21,000-gallon aboveground clarification tanks, where flocculant and solids separate from the water. Storm water overflows from the second clarifier and is pumped through four, 48-inch diameter sand filters. Effluent from the treatment system then is discharged to the Lauritzen Channel at the interceptor SW-5 outfall. TS-2 is equipped with a variable speed drive for pump control, a programmable logic controller, and a human machine interface.

The estimated flow for the SW-3 to SW-7 catchments that results from a 0.2 inch per hour design storm intensity⁵ is approximately 500 gallons per minute (gpm). TS-2 is designed to treat approximately 650 gpm. Additionally, due to the storage volume provided by interceptors and clarifiers, the system is able to capture and treat periods of storm water flow in excess of 650 gpm before treatment bypass occurs.

⁴ The storm water treatment system was described in the 2014-2015 annual report and a telephone conversation (December 26, 2014) and email correspondence (January 26, 2016) between Rachelle Thompson of EPA and Scott Bourne, formerly of Weiss Associates.

⁵ Design criteria for flow-based treatment established in Industrial General Permit (IGP) (SWRCB, 2014).

3 OPERATION AND MAINTENANCE

This section describes the operation and maintenance activities performed by LRTC for the upland cap at the Heckathorn Site during the 2019-2020 reporting year. These activities included:

- Upland cap maintenance;
- Storm water collection system inspection and cleaning;
- Storm water monitoring;
- Storm water treatment and operation; and
- Sheet pile seep sampling.

3.1 Upland Cap Maintenance

During the 2019-2020 reporting year, LRTC monitored the performance of the concrete cap and gravel cover in accordance with recommendations contained in the 2018-2019 Annual Report (CDIM, 2019). LRTC regularly monitored the cap and inspected cracks, seals, and joints for signs of propagation and/or degradation. No evidence of exposed underlying soil was observed. The upland cap functioned as designed, and no major maintenance or repair of the cap was conducted during the current reporting period.

LRTC installed a new drain pipe from existing drain inlet 3DI-105 during the 2019-2020 reporting period. The drain inlet, which is located immediately west of interceptor SW-3, previously drained directly into the interceptor. Approximately 30 linear feet of drain pipe was added inside the interceptor to carry the collected water to the inlet end of the interceptor (Appendix A; Photo 2). This modification was completed to facilitate settlement of sediments in the storm water prior to the storm water reaching the pumps that transfer water to water treatment TS-2.

LRTC also installed new concrete landscaping planters at the Site during the 2019-2020 reporting period, including one planter located north of treatment system TS-2 that replaced a previously graveled area. Locations of the concrete planters are shown on Figure 3.

3.2 Storm Water Collection System Inspection and Cleaning

LRTC inspected the storm drain inlets, interceptors and clarifier tanks prior to the 2019-2020 rainy season and monthly throughout the reporting year per its Storm Water Pollution Prevention Plan (SWPPP; CDIM, 2019a). Storm water interceptors and the clarifier tanks were cleaned before the start of the rainy season. Drain inlets and inlet filters were cleaned and replaced as-needed throughout the year.

3.3 Storm Water Monitoring

The objective of the storm water monitoring program is to verify the cap is effectively preventing erosion, reducing the potential for storm water contact with soils containing residual pesticides and reducing the potential

for release of residual pesticides to the Lauritzen Channel. This section describes the storm water sampling, results, and quality assurance/quality control procedures. It also includes an assessment of the results.

3.3.1 Storm Water Sampling

LRTC sampled industrial storm water discharges in accordance with State Water Resources Control Board (SWRCB) Water Quality Order No. 2014-0057-DWQ, National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000001, *General Permit for Storm Water Discharges Associated with Industrial Activities* (IGP; SWRCB, 2014) and the O&M Plan (PES, 1999a). Storm water monitoring requirements are documented in LRTC's SWPPP.

Prior to 2015, LRTC collected samples from interceptors SW-3 through SW-7. Since installing advanced treatment system TS-2, LRTC no longer regularly discharges storm water at these locations. As a result, LRTC now collects storm water samples from the TS-2 influent and effluent.⁶ In the event that elevated pesticides are detected in the TS-2 influent or effluent, LRTC is prepared to sample at interceptors SW-3 through SW-7.

Storm water samples were submitted to Vista Analytical in El Dorado Hills, California for pesticide analysis by EPA Method 1699. Storm water samples were submitted to Pace Analytical National Laboratories in Mount Juliet, Tennessee for the following analyses: pH by Standard Method 4500HB, total suspended solids (TSS) by Standard Method 2540D, oil and grease (O&G) by EPA 1644A, and metals by EPA Method 200.8. Original laboratory reports, including applicable chain-of-custody forms, are included in Appendix B.⁷

3.3.2 Sample Results

During the 2019-2020 reporting year, storm water from the combined TS-2 influent and effluent was sampled during three storm events: December 7, 2019; December 18, 2019; and January 16, 2020.⁸

3.3.2.1 Effluent Sample Results

Tables 1 and 2 show laboratory analytical results for pesticides and general parameters/metals, respectively. Pesticides were detected in the treated storm water discharge samples (TS2-E) from each of the three storm events sampled during the 2019-2020 reporting year. Total DDT⁹ was detected at concentrations ranging from 330 to 6,409 picograms per liter (pg/L); dieldrin was detected at concentrations ranging from 556 to 835 pg/L. TS-2 discharge results for all other pollutants (metals, O&G pH and TSS) were below the numeric action levels (NALs; State Water Resources Control Board, 2014) during the 2019-2020 reporting year.

⁶ Changes to storm water monitoring was discussed during a telephone conversation on November 3, 2015 between Rachelle Thompson of EPA and Scott Bourne formerly of Weiss Associates.

⁷ Laboratory analytical reports include data for LRT storm water discharge points that are not located in the upland cap area (TS1-E, TS3-E, TS4-E).

⁸ LRTC is eligible for and has elected to implement a Sampling Frequency Reduction under the IGP. Beginning in January 2020 and until such a time when LRTC is no longer eligible, or if requested by EPA, storm water sampling will be performed twice per reporting year.

⁹ Total DDT represents the sum of detected concentrations of 4,4' and 2,4'- isomers of DDT, DDD, and DDE and/or the detection limits for non-detected compounds.

3.3.2.2 Influent Sample Results

Samples of the combined influent to TS-2 (TS2-I) were collected during each of the three storm events. Influent samples were composited using the SW-3, SW-4, and the combined SW-5/6/7 influent feeds; volume from each feed was calculated based on the estimated runoff contribution to TS-2 discharge. Total DDT was detected in the influent at concentrations ranging from 21,052 to 50,659 pg/L; dieldrin was detected at concentrations ranging from 1,100 to 2,930 pg/L.

3.3.3 Quality Assurance/Quality Control

The O&M Plan stipulates that at least one duplicate sample be collected for analysis by EPA Method 8080 per storm sampling event. However, due to the change to EPA Method 1699, it was determined that a duplicate pesticide sample was no longer necessary. EPA Method 1699 employs high-resolution gas chromatography/high-resolution mass spectrometry with isotope dilution and internal standard quantification techniques to provide improved sensitivity and data quality. In future years, a duplicate sample can be collected upon EPA request.

Laboratory method detection limits (MDLs) for each DDT isomer, and the sum of the MDLs for all DDT isomers, were below the total DDT final surface water remediation level of 590 pg/L established in the ROD (EPA, 1994b) for all events. The MDL for dieldrin was below the final surface water remediation level of 140 pg/L.

No data quality issues were reported through the data validation process. Based on the data validation process, the data resulting from sampling and analysis are acceptable and complete.

3.3.4 Assessment of Results

Pesticides were detected in all TS-2 influent and effluent samples during the 2019-2020 reporting year. Total DDT was detected in one of the three effluent samples at concentrations above the surface water remediation level of 590 pg/L. Dieldrin was detected in all three effluent samples at concentrations above the surface water remediation level of 140 pg/L. Figures 4 and 5 present trend charts showing influent and effluent DDT and dieldrin concentrations from October 2015 to present,¹⁰ including detected concentrations and MDLs when pesticides were not detected.¹¹ Sample results from the 2019-2020 reporting year show that TS-2 is effective at reducing concentrations of total DDT, dieldrin, TSS and metals. While concentrations show a relatively high degree of variability within a rain year and between rain years, both influent and effluent concentrations in 2019-2020 reporting year were generally consistent with concentrations from previous years.

3.4 Storm Water Treatment System Operation

LRT received approximately 11.3 inches of rainfall¹² during the 2019-2020 reporting period. According to the LRTC, TS-2 provided sufficient treatment capacity to prevent treatment system bypass for all time periods when its operation was observed. No significant operation and maintenance concerns were encountered.

¹⁰ Concentration trend charts for DDT and dieldrin for individual storm water discharge locations from 2011 to 2015 are contained in the 2014-2015 Annual Report (Weiss, 2015).

¹¹ Denoted by "<n", where n is MDL, if available, or reporting limit otherwise.

¹² Rainfall from LRTC rain gauge.

3.5 Sheet Pile Seep Sampling

During low tide on or around April 13, 2020, LRTC staff observed water seepage to the Lauritzen Channel from the sheet pile wall to the south of stormwater interceptor SW-6.¹³ Figure 4 shows location of the observed water seepage. Photographs of the seepage and sampling are contained in Appendix A. Due to its location, LRTC requested that CDIM sample the seepage water for pesticide analysis.

3.5.1 Seep Observations, Sampling, and Irrigation Repair

CDIM visually observed and sampled the water seepage during a low tide event on April 16, 2020. At the time of sampling, the seep discharge rate was estimated to be two liters per minute and the electrical conductivity was measured at 0.14 milli Siemens per centimeter (mS/cm) for the seepage water and 35 mS/cm for nearby water in the Lauritzen Channel. CDIM shipped the seepage water sample under chain-of-custody to Vista Analytical for organochlorine pesticide analysis by EPA Method 1699. Results for both filtered and unfiltered sample analyses are provided in the attached Table 3. Laboratory analytical reports are included in Appendix B.

After receipt of laboratory results, CDIM revisited the Site on May 11, 2020 during a very low tide event. Two additional areas of water seepage were observed in the same vicinity.¹⁴ CDIM also identified puddling near an irrigation pipe box along Fourth Street directly east of the observed seepage, along the eastern boundary of the upland cap.

LRTC shut off water flow at the irrigation box on May 11, 2020 and performed repairs. LRTC found that tree roots appear to have separated irrigation piping in the box. Once repairs were made, water seepage along the shoreline quickly diminished and ceased on or around May 13, 2020. CDIM revisited the Site during low tide¹⁵ on June 8, 2020 and confirmed that the previously identified seeps had ceased. Another potential very low flow seep was noted adjacent to the City of Richmond outfall at this time. The measured conductivity of the seepage water was 1.8 mS/cm. The observed seepage appears to be tidal wash or a groundwater seep due to its low flow rate, different location, conductivity, and low elevation (-0.5 feet).

3.5.2 Seep Results and Discussion

The concentrations of Total DDT in the original unfiltered and filtered seep samples were 0.32 ug/L and 0.20 ug/L, respectively. High concentrations of other pesticides (e.g., endrin and related compounds) were also detected. Unfiltered groundwater concentrations at the Heckathorn Site reported in the 2014 Source Identification Report (CH2M Hill, 2014) range from 0.27 to 69.6 ug/L, and filtered concentrations range from 0.030 to 14.6 ug/L. Based on this data, the measured seep pesticide and electrical conductivity, as well as the observation of the

¹³ Seepage located at the following coordinates: 37.9243078047776, -122.366424112525 (latitude, longitude) as measured with a high resolution differential global position system device.

¹⁴ Additional seeps located at: 37.9243260033518, -122.366419505964 and 37.9245742686702, -122.366487191326

¹⁵ CDIM inspected for seeps between 8:30 AM and 9:30 AM; low tide for the Richmond Inner Harbor was -1.3 feet at 8:39 AM.

leaking irrigation line, the observed seepage water appears to have been a combination of tidewater, groundwater and irrigation water.

CDIM prepared an order of magnitude estimate of the total pesticide mass discharged from the three observed seeps into the Lauritzen Channel. The estimates were calculated using the observed discharge rate at the seep during sampling on April 16, 2020, a total of three seeps, and a conservatively estimated seep duration of 90 days. Results of the estimates are provided in Table 4. An order of magnitude estimate of 0.000244 pounds (lbs) of DDT may have been discharged from the seeps to the Lauritzen.

3.5.3 Response Action

LRTC has inventoried and added routine inspection of irrigation boxes along the Fourth Street and in other locations near the Upland Cap to its environmental inspection protocol. Additionally, LRTC will periodically visually inspect the shoreline during low tide events for evidence of seepage.

4 ANNUAL SITE INSPECTION

Representatives of LRTC and CDIM inspected the upland cap on May 29, 2020. The inspection included visual observations of the concrete cap, gravel cover, and drainage system throughout the observable extent of the upland cap area. Appendix A includes photographs taken during the inspections. Figure 3 shows the locations of the photographs. Appendix C includes the inspection form.

4.1 Concrete Cap Inspection

Visual inspections concentrated on identifying signs of deterioration and exposure of the underlying subgrade at cracks, joints, high-loading areas, gravel and cap penetrations. Areas identified in the Fourth Five-Year Review (EPA, 2016) and the 2018-2019 Annual Report (CDIM, 2019) with cracks and potential settlement were reexamined.

- **SW-3 Area** – No significant cracks or deterioration were noted in the paved SW-3 Area (Appendix A; Photos 2 and 15). The gravel cover along the east border of the property was in good condition (Appendix A; Photo 6).
- **SW-4 Area** – Minor surficial cracks and seams were observed in the bulk product storage area (Appendix A; Photos 3, 4 and 5).
- **SW-5 Area** – No significant cracks or deterioration noted in the SW-5 Area, and previous repairs remain in good condition (Appendix A; Photos 1 and 7).
- **SW-6 Area** – No significant cracks or deterioration were noted in the concrete in the SW-6 Area (Appendix A; Photos 8 and 9). Gravel cover in this area was found to be in good condition (Appendix A; Photos 12, 13, and 14).
- **SW-7 Area** – No significant cracks or deterioration were noted in the concrete in the SW-7 Area (Appendix A; Photos 10 and 16). Shotcrete applied to the northern shoreline of the Lauritzen Channel appeared to be in good condition (Appendix A; Photo 11).

No evidence of differential settling or vertical displacement was observed across the cap. No evidence of cracks, gaps, significant cap deterioration, or other material breach with apparent potential for exposure of the underlying subgrade was observed during the inspection. CDIM recommends that LRTC continue to monitor the cap for signs of deterioration.

4.2 Gravel Cover Inspection

Visual observations of the gravel cover concentrated on identifying areas where the gravel cover was thin. A geotextile membrane underlies the gravel cover, but it was not visually observed in any of the areas inspected. Below is a summary of observations from the concrete cap inspection.

- **SW-3 Area** – The gravel cover appeared adequate; the underlying geotextile fabric was not exposed in any area (Appendix A; Photo 6).
- **SW-4 Area** – The gravel cover appeared adequate; the underlying geotextile fabric was not exposed in any area.

- **SW-5 Area** – The gravel cover appeared adequate; the underlying geotextile fabric was not exposed in any area (Appendix A; Photo 13).
- **SW-6 Area** – The gravel cover appeared adequate; the underlying geotextile fabric was not exposed in any area (Appendix A; Photos 12 and 14).

No visual evidence of differential settling or vertical displacement was observed. Overall, the gravel cover was found to be in good condition and functioning properly with no apparent potential for exposure of the underlying subgrade. CDIM recommends that LRTC continue to regularly inspect the gravel cover and to perform maintenance as detailed in Section 5.

4.3 Triennial Upland Cap Survey

In its Third-Five Year Review, the EPA recommended that the upland cap be periodically surveyed to monitor for differential settlement that could impact cap integrity (EPA, 2011). The baseline triennial survey was completed in May 2014 and included in the 2013-2014 Annual Report (Weiss, 2014); the second triennial survey was completed in May 2017 and included in the 2016-2017 Annual Report (CDIM, 2017).

Dillon & Murphy of Lodi, California performed the third triennial survey on April 16, 2020. The survey plat provided in Appendix D present the 2020 point elevations as well as the baseline and 2017 elevations for comparison. Two previous survey points were destroyed during concrete patching and repaving activities; replacement survey points were taken for future comparisons. Elevations were within 0.01 inches at all other existing survey locations, indicating no differential settlement has occurred in the previous six years. Triennial surveys will remain a part of the Site O&M program, with the next survey to occur during the 2022-2023 reporting period.

5 PROPOSED SITE WORK FOR 2020-2021

During the 2020-2021 reporting year, the following O&M activities are proposed:

- Storm water discharge samples will be collected from the TS-2 treatment system effluent (combined SW-3 through SW-7) discharge location. TS-2 influent samples will also be collected to evaluate system effectiveness.
- Regular inspections of the upland capping system, including the drainage system, will continue as part of the SWPPP (CDIM, 2020) compliance activities and daily operations.
- Routine inspection of irrigation boxes and other irrigation features will be performed as part of environmental inspection programs.
- Periodic visual inspection of the shoreline during low tide events for evidence of seepage.
- An annual inspection of the concrete cap and gravel cover in the upland cap area will be performed in the early summer of 2021.
- As needed, significant cracks will be filled, and deteriorated sections of concrete in the upland capping system will be replaced.

Proposed site work under the O&M Plan for 2020-2021 is presented in Table 3.

Any repairs to the cap, if required, will be documented and reported in a memorandum to the EPA and the California Department of Toxic Substances Control.

6 CONCLUSIONS AND RECOMMENDATIONS

The annual upland capping system inspection found that the surface cap is in overall good condition, and it effectively functions to prevent erosion of the underlying soil. Storm water sampling results from the upland cap area indicate that treatment system TS-2 is effective in reducing the discharge of pesticides.

CDIM recommends continuing the following maintenance and monitoring activities:

- Continue to monitor gravel cover areas and add gravel as needed;
- As needed, fill any significant cracks, and replace deteriorated sections of concrete in the upland capping system;
- Implement regular inspections and BMPs identified in LRTC's SWPPP (CDIM, 2020);
- Implement regular inspection of irrigation boxes and other irrigation features to identify leakage and conduct repairs; and,
- Continue to monitor storm water for pesticides as described herein.

7 REFERENCES

- CDIM Engineering (CDIM), 2020. Storm Water Pollution Prevention Plan, Levin Richmond Terminal, 402 Wright Avenue, Richmond, California, July.
- _____, 2019. 2018-2019 Annual Report for United Heckathorn Superfund Site, Upland Capping System, Richmond, California, September 30.
- _____, 2017. 2016-2017 Annual Report for United Heckathorn Superfund Site, Upland Capping System, Richmond, California, August 25.
- CH2M Hill, 2014. Source Identification Study Report. United Heckathorn Superfund Site. Report Prepared for U.S. EPA. March.
- PES Environmental, Inc. (PES), 1998. Pre-Final/Final Design and Remedial Action Work Plan, Former United Heckathorn Site, Upland Capping Project, Richmond, California. April 7.
- _____, 1999a. Revised Draft Operations and Maintenance Plan, Upland Capping System, Former United Heckathorn Site, March.
- _____, 1999b. Report Requesting Certification of Completion of Upland Cap Installation, Former United Heckathorn Facility. September 16.
- State Water Resources Control Board, 2014. General Permit for Storm Water Discharges Associated with Industrial Activities, Order No. 2014-0057-DWQ, National Pollutant Discharge Elimination System General Permit No. CAS000001, April.
- United States District Court, Northern District of California, 1996a. Consent Decree, Levin Group RD/RA, United States of America Plaintiff v. Montrose Chemical Corporation of California, et al., June.
- _____, 1996b. Consent Decree, Montrose Group RD/RA, United States of America Plaintiff v. Montrose Chemical Corporation of California, et al., July 19.
- United States Environmental Protection Agency (EPA), 1994a. Feasibility Study for the United Heckathorn Superfund Site, Richmond, California. July.
- _____, 1994b. EPA Superfund Record of Decision: United Heckathorn Co., EPA ID: CAD981436363; OU 01, Richmond, CA, EPA/ROD/R09-96/5021996, October.
- _____, 2011. Third Five-Year Review Report for United Heckathorn Superfund Site, Richmond, California, September.
- _____, 2016. Fourth Five-Year Review Report for United Heckathorn Superfund Site, Richmond, California, August.



Weiss Associates, 2014. 2013-2014 Annual Report for the United Heckathorn Superfund Site, Upland Capping System, Richmond, California, July 15.

_____, 2015. 2014-2015 Annual Report for the United Heckathorn Superfund Site, Upland Capping System, Richmond, California, September 11.



TABLES



Table 1. 2019-2020 Annual Storm Water Sampling Data for Pesticides

Discharge Location	Analytical results ^a																												
	2,4'-DDD pg/L	4,4'-DDD pg/L	2,4'-DDE pg/L	4,4'-DDE pg/L	2,4'-DDT pg/L	4,4'-DDT pg/L	Total DDT pg/L	Aldrin pg/L	alpha-BHC pg/L	alpha-Chlordane pg/L	beta-BHC pg/L	cis-Nonachlor pg/L	delta-BHC pg/L	Dieldrin pg/L	Endosulfan I pg/L	Endosulfan II pg/L	Endosulfan sulfate pg/L	Endrin pg/L	Endrin aldehyde pg/L	Endrin ketone pg/L	gamma-BHC (Lindane) pg/L	gamma-Chlordane pg/L	Heptachlor pg/L	Heptachlor epoxide ^e pg/L	Hexachlorobenzene pg/L	Methoxychlor pg/L	Mirex pg/L	Oxychlordane pg/L	trans-Nonachlor pg/L
INFLUENT																													
TS2-I ^b																													
12/7/2019	2,280	3,850	326.0	5,120	5,060	11,100	27,736	10.3	51.3	913	54.7	133	<12.5	1,590	<36	<123	<91.09	923	<81	624	69.5	912	53.7	<321.5 **	1,010	<120	<26.1	<30.8	497
12/18/2019	1,640	2,780	252*	4,210*	2,570	9,600	21,052	7.7 J	73.8	789	45.4	<42.3	<42.3	1,100	<211	<211	<211	341	<211	<211	48.1	736	<42.3	85	2,130	<42.3	<42.3	<42.3	425
1/16/2020	5,160	7,810	869*	10,900*	7,520	18,400	50,659	40.7	103.0	1,380	74.1	195*	<38.7	2,930	<193	<193	<193	1,370*	<193	<193	65.2	1,390	<38.7	138	1,990 B	<38.7	<38.7	<38.7	762
EFFLUENT																													
TS2-E ^c																													
12/7/2019	72.6	86.5	<5.949	46.5	40.6	76.6	330	<6.369	39.6	54.8	68.4	<27.79	<6.86	621	<35	<56 **	<69	226	<45.29	381	59	57.3	<4.09 **	295.7	34.7	<9.59	<5.69	<23.29	<19.7
12/18/2019	102	149	17.7 J	134	109	219	731	<42.0	57.4	72.1	83.1	<42.0	<42.0	556	<210	<210	<210	202	<210	299	62.8	61.7	<42.0	218	88.0 B	<42.0	<42.0	<42.0	39.6 J
1/16/2020	715	1,130	114	1,320	990	2,140	6,409	<39.2	57.0	226	64.6	<39.2	<39.2	835	<196	<196	<196	279	<196	<196	48.7	191	<39.2	73	434 B	<39.2	<39.2	<39.2	105
Remediation Goal ^d							590							140															

Notes:
Detected concentrations of pesticides are displayed in **bold**.
** Non-detect result reported to "estimated maximum possible concentration" rather than method detection limit.
^a Laboratory method EPA 1699.
^b TS2-I is the combined influent from interceptors SW-3 to SW-7 and does not represent discharge. It is used to evaluate TS-2 effectiveness.
^c TS2-E is the effluent of treatment system TS-2, which treats storm water from interceptors SW-3 to SW-7. It represents facility discharge.
^d Remediation goal from USEPA Superfund Record of Decision: United Heckathorn Co., October 1994, for surface waters in the Lauritzen, Santa Fe, and lower Richmond Inner Harbor Channels.
^e Reported result is sum of detected cis- and trans-heptachlor epoxide concentrations.

Acronyms/Abbreviations:
< n =not detected above the sample-specific estimated detection limit
B = compound was also detected in laboratory method blank
D = sample diluted for analysis; concentration calculated value
J = concentration reported is an estimated value
pg/L = picograms per liter
USEPA = United States Environmental Protection Agency

Table 2. 2019-2020 Annual Storm Water Sampling Data for General Parameters and Metals

Discharge Location	Notes	Analytical Parameters ^a									
		pH	O&G (HEM)	TSS	Aluminum	Copper	Iron	Lead	Zinc		
		-	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L		
INFLUENT											
TS2-I ^b											
12/7/2019		7.64	<5.26	16	J	208	--	361	9.24		95.3
12/18/2019		7.58	<5.44	<u>790</u>		144	--	342	4.63		65.6
1/16/2020		7.36	<5.44	<u>136</u>		685		<u>2,050</u>	19		149
EFFLUENT											
TS2-E ^c											
12/7/2019		7.56	<5.56	0.52	J	<100	--	39.3	J	0.761	B J 50.3
12/7/2019	Duplicate	7.56	<5.38	<2.5		<100	--	34.9	J	0.562	J 55.0
12/18/2019		7.42	<5.26	4.5		<100	--	20.4	J	0.568	J 24.8
1/16/2020		7.52	<5.49	28.8		103.0		300		2.88	44.1
1/16/2020	Duplicate	7.54	<5.49	28.6		96.6	J	307		2.78	43.4
2014 IGP Numeric Action Levels (NALs) ^d		6.0-9.0 ^e	15	100		750	33.2	1,000		262	260

Notes:

Bold values exceed 2014 IGP NALs listed at the bottom of the table.

^a Laboratory Methods: pH by SM4500HB; TSS by SM2540D, O&G by EPA 1664A; metals by EPA 200.8.

^b TS2-I is the combined influent from interceptors SW-3 to SW-7 and does not represent discharge. It is used to evaluate TS-2 effectiveness.

^c TS2-E is the effluent of treatment system TS-2, which treats storm water from interceptors SW-3 to SW-7.

^d Numeric Action Level (NAL) in 2014 General Permit for Storm Water Discharges Associated with Industrial Activities (2014 IGP). California State Water Resources Control Board, April 1, 2014. Annual average unless otherwise noted.

Acronyms/Abbreviations:

< n = not detected above the detection limit

B = analyte was present in the associated method blank

EPA = Environmental Protection Agency

IGP = Industrial General Permit

J = concentration reported is an estimated value

mg/L = milligrams per liter

NAL = numeric action level

O&G HEM = oil and grease, hexane extractable material

TSS = total suspended solids

ug/L = micrograms per liter

Table 3. Seep Sample Results

Constituent	Field Measurements			
	Seep-200416		Bay Water ¹	
pH	7.01		7.85	
Temperature (°C)	18.6		18.8	
Electrical Conductivity (mS/cm)	0.416		34.887	
Turbidity (NTU)	14.9		5.6	
Constituent	Laboratory Results ²			
	Seep-200416		Seep-200416 (Filtered)	
	pg/L		pg/L	
2,4'-DDD	37,200	D	28,100	D
4,4'-DDD	31,000	D	22,200	
<i>Total DDD</i>	<i>68,200</i>		<i>50,300</i>	
2,4'-DDE	6,270		4,050	
4,4'-DDE	103,000	D	62,700	D
<i>Total DDE</i>	<i>109,270</i>		<i>66,750</i>	
2,4'-DDT	45,800	D	29,000	D
4,4'-DDT	96,400	D	56,400	D
<i>Total DDT</i>	<i>142,200</i>		<i>85,400</i>	
<i>Sum of DDT Isomers</i>	<i>319,670</i>	<i>D</i>	<i>202,450</i>	<i>D</i>
Aldrin	2,480		1,660	
alpha-BHC	49.9		37.7	J
beta-BHC	344		315	
delta-BHC	< 39.6		< 41.9	
gamma-BHC (Lindane)	16	J	< 41.9	
alpha-Chlordane	47,800	D	35,500	D
gamma-Chlordane	29,000	D	29,000	D
cis-Nonachlor	3,830		2730	
Dieldrin	841,000	D, B	657,000	D, B
Endosulfan I	< 198		< 209	
Endosulfan II	< 198		< 209	
Endosulfan sulfate	< 198		< 209	
Endrin	400,000	D	345,000	D
Endrin aldehyde	91,000	D	150,000	D
Endrin ketone	1,880,000	D	1,540,000	D
Heptachlor	1,180		940	
cis-Heptachlor epoxide	3,470		3,230	
trans-Heptachlor epoxide	58,100	D	50,900	D
Hexachlorobenzene	1,760	B	1,380	B
4,4-Methoxychlor	< 198		< 209	
Mirex	< 39.6		< 41.9	
trans-Nonachlor	15,000	D	10,100	D
Oxychlordane	< 39.6		< 41.9	

Notes:
Italic results indicate calculated value

1. Field measurements also taken for sample of Bay water from Lauritzen Channel for comparison purposes.

2. Samples analyzed for organochlorine pesticides (EPA Method 1699) by Vista Analytical in El Dorado Hills, CA.



Abbreviations:

B - compound also detected in method blank

BHC - benzene hexachloride

°C - degrees Celsius

D - result from diluted sample

DDD - dichlorodiphenyldichloroethane

DDE - dichlorodiphenyldichloroethylene

DDT - dichlorodiphenyltrichloroethane

EPA - United States Environmental Protection Agency

J - result below applicable reporting limit; qualified as estimated

mS/cm - miliSiemens per centimeter

NTU - nephelometric turbidity unit

pg/L - picograms per liter

Table 4. Seep Pesticide Mass Discharge Estimate

Observed Flow Rate per Seep (L/min) ¹	2	
Observed Number of Seeps ²	3	
Estimated Duration of Seep (days) ³	90	
Constituent	April 16, 2020 Seep Sample Results ⁴ pg/L	Total Estimated Mass ⁵ lb
2,4'-DDD	37,200 D	6.38E-05
4,4'-DDD	31,000 D	5.31E-05
<i>Total DDD</i>	<i>68,200</i>	<i>1.17E-04</i>
2,4'-DDE	6,270	1.07E-05
4,4'-DDE	103,000 D	1.77E-04
<i>Total DDE</i>	<i>109,270</i>	<i>1.87E-04</i>
2,4'-DDT	45,800 D	7.85E-05
4,4'-DDT	96,400 D	1.65E-04
<i>Total DDT</i>	<i>142,200</i>	<i>2.44E-04</i>
<i>Sum of DDT Isomers</i>	<i>319,670</i> D	<i>5.48E-04</i>
Aldrin	2,480	4.25E-06
alpha-BHC	49.9	8.55E-08
beta-BHC	344	5.90E-07
delta-BHC	< 39.6	3.39E-08
gamma-BHC (Lindane)	16 J	2.76E-08
alpha-Chlordane	47,800 D	8.19E-05
gamma-Chlordane	29,000 D	4.97E-05
cis-Nonachlor	3,830	6.57E-06
Dieldrin	841,000 D, B	1.44E-03
Endosulfan I	< 198	1.70E-07
Endosulfan II	< 198	1.70E-07
Endosulfan sulfate	< 198	1.70E-07
Endrin	400,000 D	6.86E-04
Endrin aldehyde	91,000 D	1.56E-04
Endrin ketone	1,880,000 D	3.22E-03
Heptachlor	1,180	2.02E-06
cis-Heptachlor epoxide	3,470	5.95E-06
trans-Heptachlor epoxide	58,100 D	9.96E-05
Hexachlorobenzene	1,760 B	3.02E-06
4,4-Methoxychlor	< 198	1.70E-07
Mirex	< 39.6	3.39E-08
trans-Nonachlor	15,000 D	2.57E-05
Oxychlordane	< 39.6	3.39E-08

Notes:
Italic results indicate calculated value

- Flow rate observed during sampling performed on April 16, 2020 at seep located south of interceptor SW-6.
- During a site visit on May 11, 2020, an additional two seeps were observed; flow rate from each seep assumed equal.
- Seep duration estimated as 90 days to provide a conservative discharge estimate.
- Sample "Seep-200416" analyzed for organochlorine pesticides (EPA Method 1699) by Vista Analytical in El Dorado Hills, CA.
- Mass for non-detected analytes estimated using half of reporting limit as result.

Abbreviations:

B - compound also detected in method blank
BHC - benzene hexachloride
D - result from diluted sample
DDD - dichlorodiphenyldichloroethane

DDE - dichlorodiphenyldichloroethylene
DDT - dichlorodiphenyltrichloroethane
EPA - United States Environmental Protection
J - result below applicable reporting limit; quali

Table 5. Proposed Site Work for 2020-2021, Levin Richmond Terminal Corporation

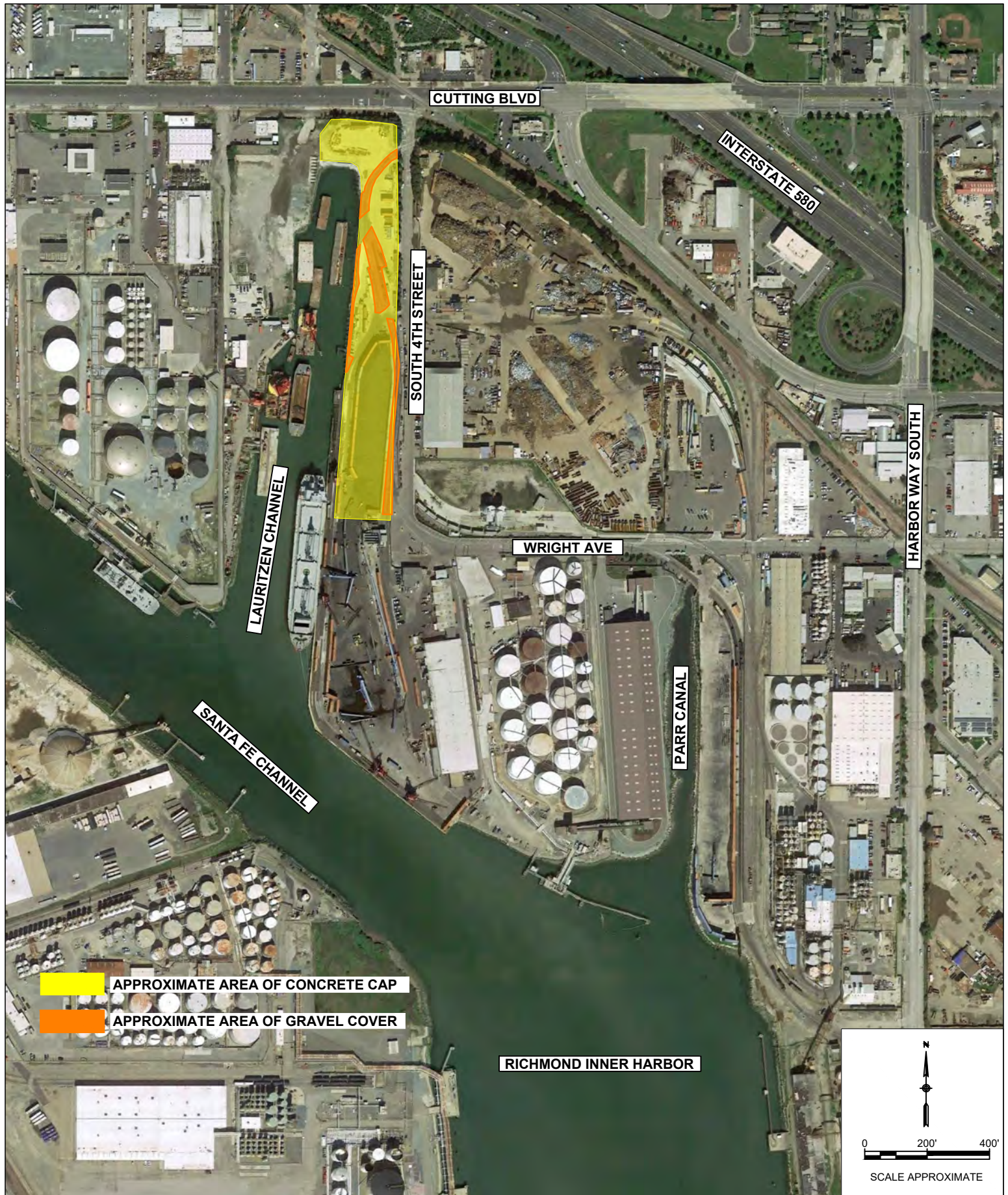
Aspect	Description	Anticipated Completion Date
General	Implement activities (i.e., cap maintenance, storm water monitoring, interceptor cleanout, irrigation feature inspection) described in the O&M Plan. ¹	Continuously
	Submit report of O&M performed for the period of July 1, 2020 to June 30, 2021.	On/around August 15, 2021
Concrete Cap	Perform 2020-2021 annual inspection of the cap under oversight of a registered engineer.	June 1, 2021
	Monitor identified cracks, seals, and joints for signs of propagation and/or degradation throughout upland capping system.	Continuously
Gravel Cover	Monitor the gravel cover throughout the Upland Area for signs of thinning or ground exposure.	Continuously
Storm Water System	Continue to treat combined storm water pumped from interceptors SW-3, SW-4, SW-5, SW-6, and SW-7 at treatment system TS-2 using flocculation, settling, and filtration methods.	Continuously

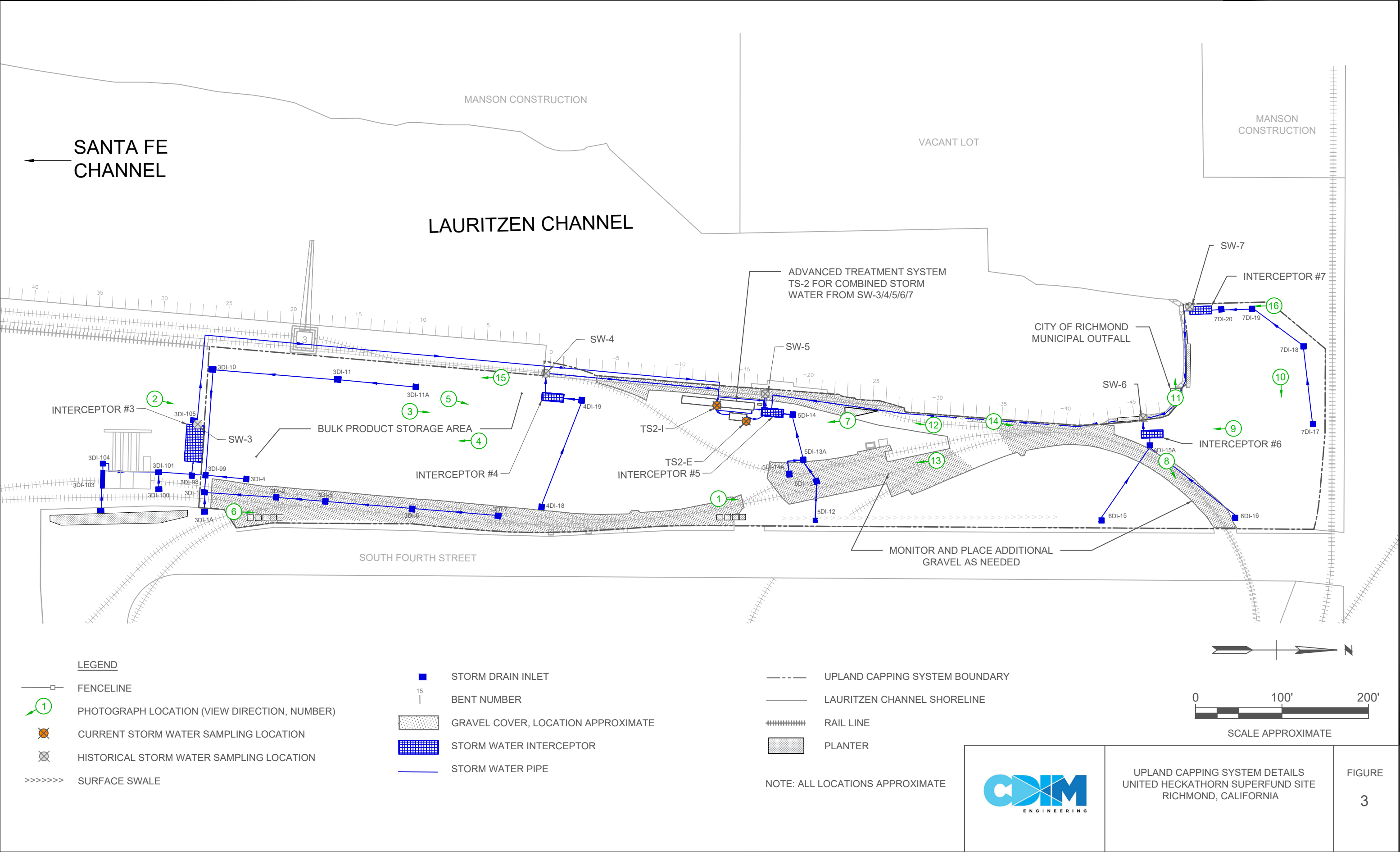
1. *Revised Draft Operations and Maintenance Plan, Upland Capping System, Former United Heckathorn Site*, PES Environmental, Inc., March 1999.

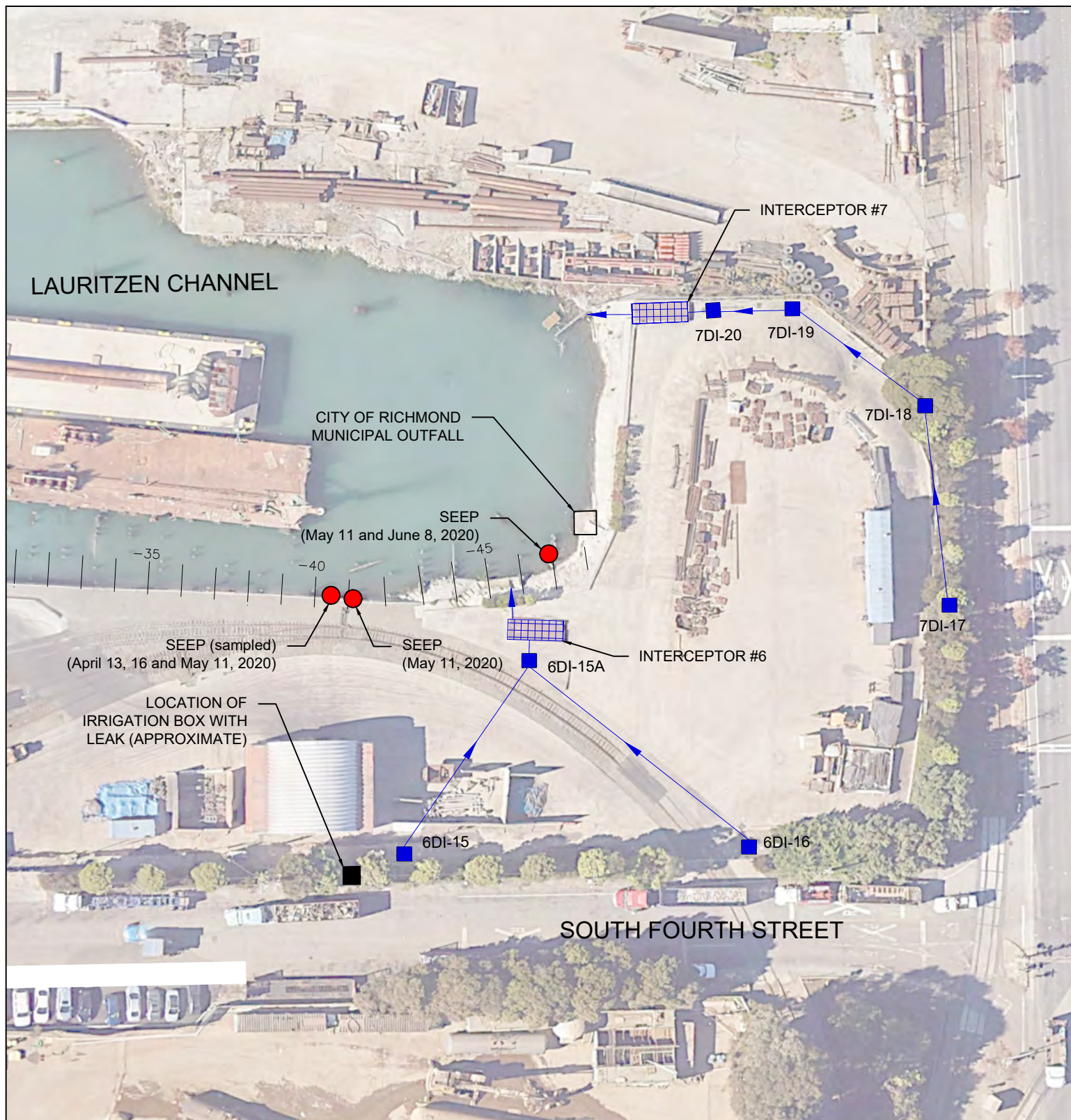


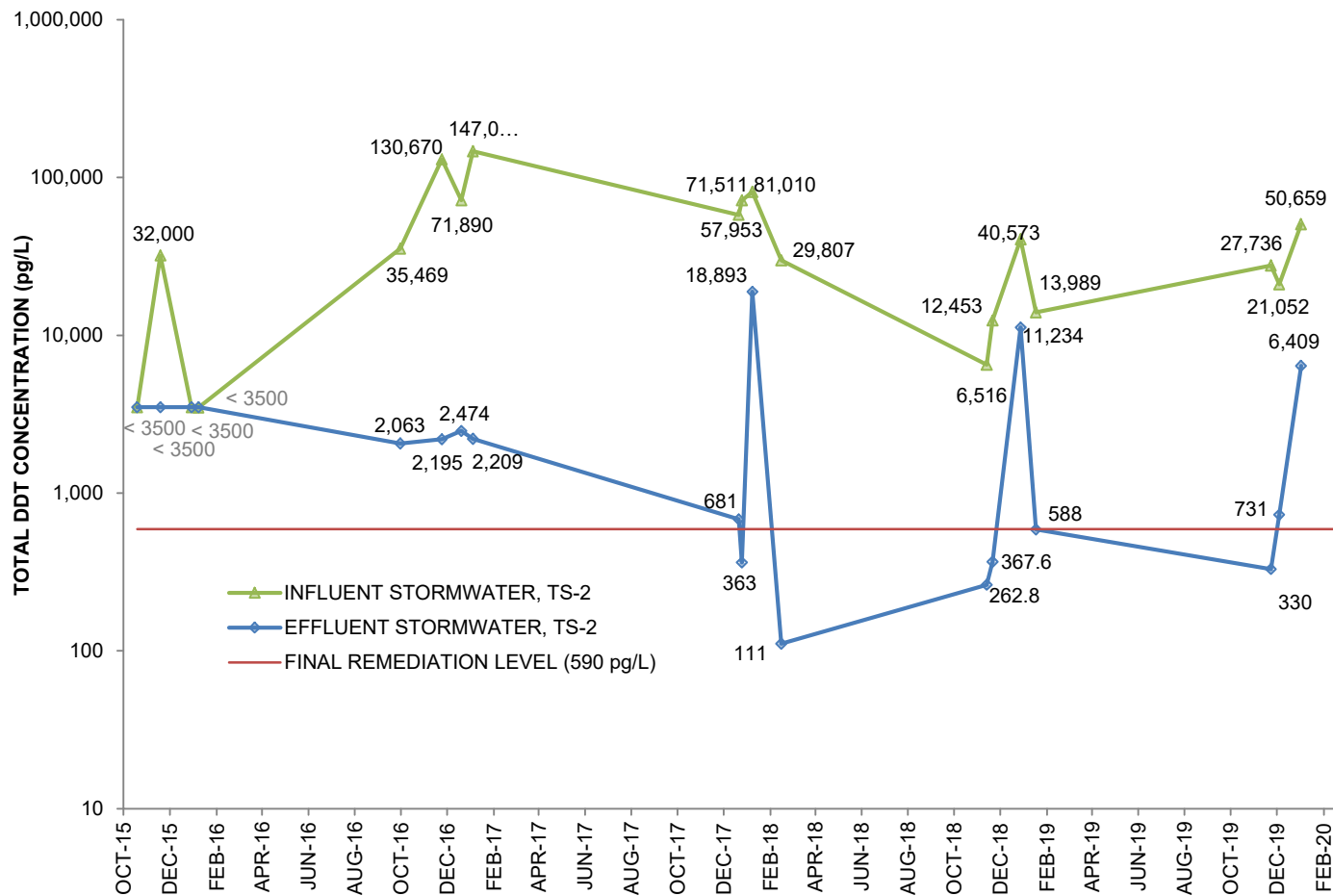
FIGURES











NOTES:

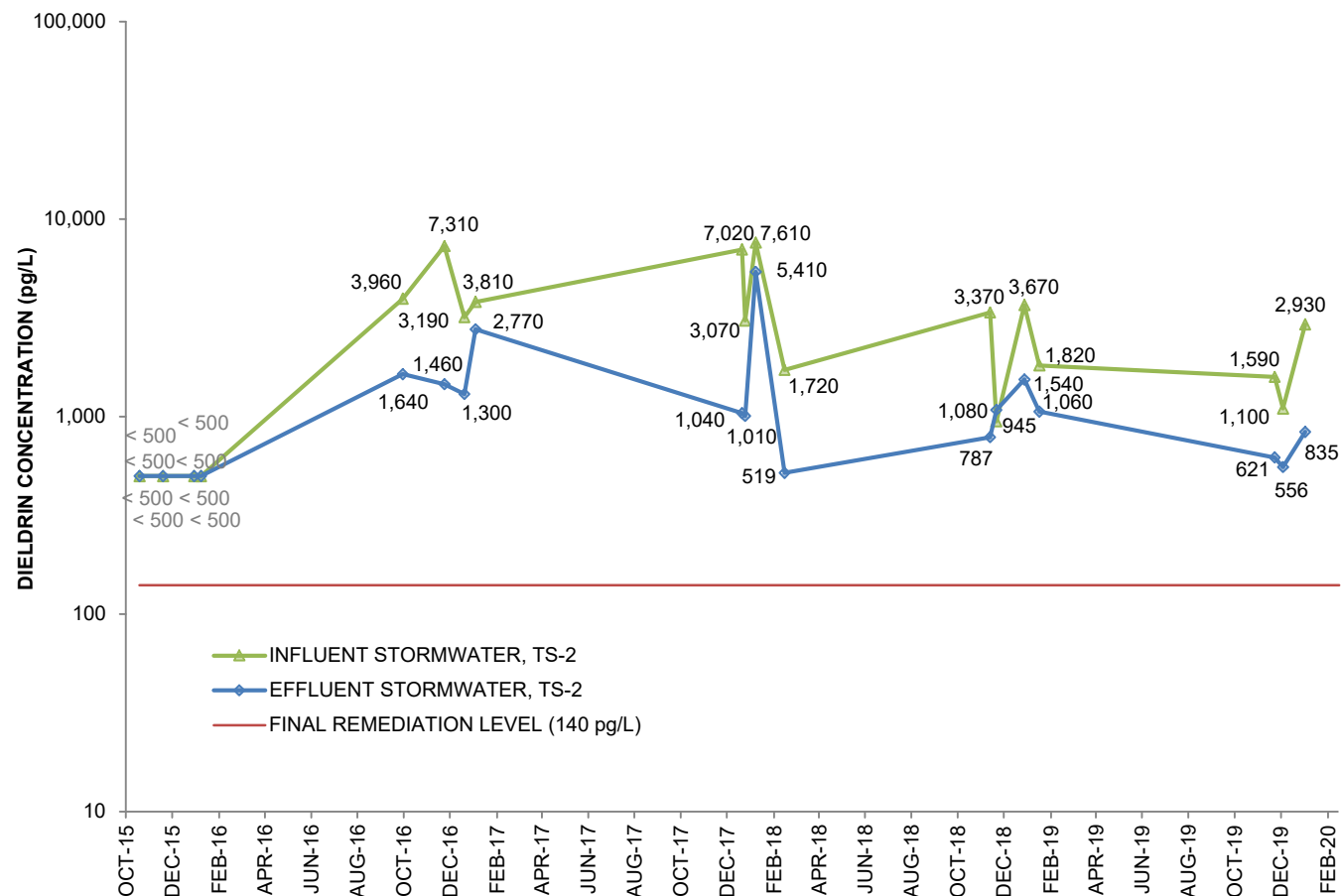
1. TOTAL DDT REPRESENTS THE SUM OF DETECTED DDT, DDD, AND DDE CONCENTRATIONS AND/OR DETECTION LIMITS FOR NON-DETECTED COMPOUNDS (DENOTED BY < N).
2. RESULTS REPORTED IN pg/L



45 POLK STREET, THIRD FLOOR
SAN FRANCISCO, CA 94102
WWW.CDIMENGINEERING.COM
PH: (415) 498-0535

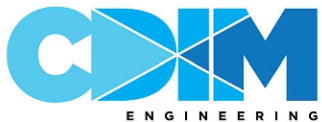
TOTAL DDT IN STORMWATER, 2015-2020
TREATMENT SYSTEM TS-2
UNITED HECKATHORN SUPERFUND SITE
UPLAND CAPPING SYSTEM
RICHMOND, CALIFORNIA

FIGURE
5



NOTES:

1. RESULTS REPORTED IN pg/L



45 POLK STREET, THIRD FLOOR
SAN FRANCISCO, CA 94102
WWW.CDIMENGINEERING.COM
PH: (415) 498-0535

DIELDRIN IN STORMWATER, 2015-2020
TREATMENT SYSTEM TS-2
UNITED HECKATHORN SUPERFUND SITE
UPLAND CAPPING SYSTEM
RICHMOND, CALIFORNIA

FIGURE
6



APPENDIX A

Upland Capping System Inspection Photographs



Photo 1 – Photo taken during the 2019-2020 Annual Upland Capping System Inspection. No change in condition on previous repairs.



Photo 2 – Drain inlet 3DI-105 (under rubber cover) and interceptor SW-3 where piping modifications were made during the 2019-2020 reporting year.



Photo 3 – Looking north at the area south of the secondary bulk product storage area. No significant cracking or deterioration is visible.



Photo 4 – Looking south: surficial cracking within secondary storage area.



Photo 5 – Looking northeast: seams and surficial cracking within secondary storage area.



Photo 6 – Gravel cover along the east border of the property. Planter boxes have been installed along the fence line.



Photo 7 – Looking south toward TS-2, no significant cracks or deterioration noted in the area.



Photo 8 – Looking northeast near northeast gate. No significant cracks or deterioration noted in the area. Gravel cover along railroad tracks appears adequate, with no underlying geotextile exposed.



Photo 9 – Looking south toward SW-6. No significant crack or deterioration noted in the area.



Photo 10 – Looking east at concrete cap north of the Lauritzen Channel. No significant cracks or deterioration noted in the area.



Photo 11 – Looking west toward the municipal outfall, at the north end of the Lauritzen Channel. Shotcrete has been applied to stabilize the area along the shoreline.



Photo 12 – Looking south: gravel cover is visible along the Lauritzen Channel north of TS-2.



Photo 13 – Looking south in railroad maintenance area. Gravel cover in good condition with no geotextile exposed.



Photo 14 – Looking north at the concrete cap and gravel cover along Lauritzen Channel.



Photo 15 – Looking south along western border of the site. Concrete seams and minor surficial cracking.



Photo 16 – Looking south toward interceptor SW-7 at the concrete cap in good condition.



Photo 17 – Location of Seeps #1 and #2, located approximately Bent -40.5 and Bent -41 respectively.



Photo 18 – Close-up of Seep #1 (left) and Seep #2 (right).



Photo 19 – In South 4th Street, looking west at the LRT fenceline. Pooling adjacent to irrigation box (left) and damaged irrigation box (right) observed on May 11, 2020.

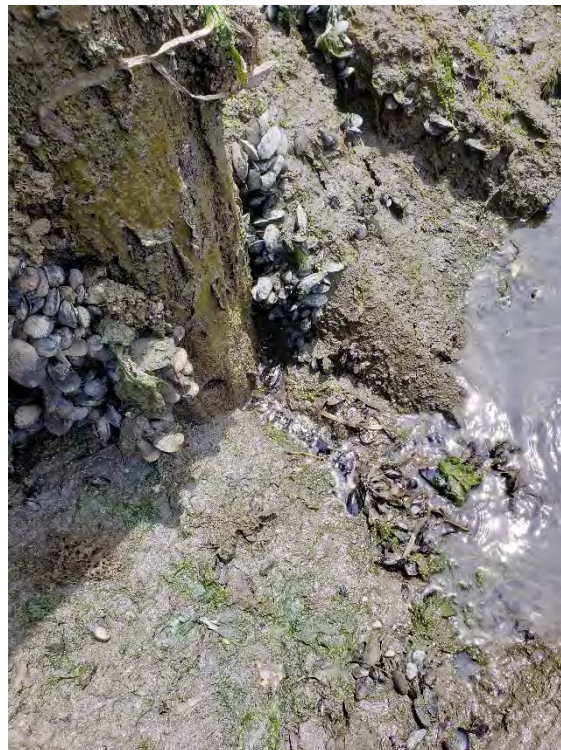


Photo 20 – Seep #3 located west of interceptor SW-6 at approximately Bent -47.



APPENDIX B

Laboratory Analytical Reports



January 02, 2020

Vista Work Order No. 1904267

Mr. Scott Bourne
CDIM Engineering
45 Polk Street, 3rd Floor
San Francisco, CA 94102

Dear Mr. Bourne,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on December 09, 2019 under your Project Name 'LRTC Industrial Stormwater 101-004'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at mmaier@vista-analytical.com.

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier
Laboratory Director



Vista Analytical Laboratory certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Vista.

Vista Work Order No. 1904267

Case Narrative

Sample Condition on Receipt:

One water sample was received in good condition and within the method temperature requirements. The sample was received and stored securely in accordance with Vista standard operating procedures and EPA methodology.

Analytical Notes:

EPA Method 1699

The sample was extracted and analyzed for chlorinated pesticides by EPA Method 1699 using a ZB-50 GC column.

Holding Times

As requested, the three bottles of the sample were composited prior to extraction. Approximately, one liter of the composite was extracted and analyzed within the method hold times.

Quality Control

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected above the sample quantitation limits in the Method Blank. The OPR recoveries were within the method acceptance criteria.

The labeled standard recoveries outside the method acceptance criteria are listed in the table below:

QC Anomalies

LabNumber	SampleName	Analysis	Analyte	Flag	%Rec
1904267-01	TS2-I-191207	EPA Method 1699	13C10-Heptachlor	H	153
B9L0133-BS1	B9L0133-BS1	EPA Method 1699	13C10-Heptachlor	H	136

H = Recovery was outside laboratory acceptance criteria.

TABLE OF CONTENTS

Case Narrative.....	1
Table of Contents.....	3
Sample Inventory.....	4
Analytical Results.....	5
Qualifiers.....	9
Certifications.....	10
Sample Receipt.....	13

Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
1904267-01	TS2-I-191207	07-Dec-19 08:35	09-Dec-19 07:16	Amber Glass NM Bottle, 1L Amber Glass NM Bottle, 1L Amber Glass NM Bottle, 1L

ANALYTICAL RESULTS

Sample ID: Method Blank					EPA Method 1699				
Matrix: Aqueous		QC Batch: B9L0133			Lab Sample: B9L0133-BLK1				
Sample Size: 1.00 L		Date Extracted: 12-Dec-2019 6:15			Date Analyzed: 31-Dec-19 18:29 Column: ZB-50				
Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers	
Hexachlorobenzene	10.3			J	IS 13C6-Hexachlorobenzene	32.1	5 - 120		
alpha-BHC	ND	5.45			IS 13C6-alpha-BHC	59.4	32 - 130		
Lindane (gamma-BHC)	ND	8.31			IS 13C6-Lindane (gamma-BHC)	60.0	11 - 120		
beta-BHC	ND	7.78			IS 13C6-beta-BHC	60.1	32 - 130		
delta-BHC	ND	6.25			IS 13C6-delta-BHC	60.6	36 - 137		
Heptachlor	ND	1.35			IS 13C10-Heptachlor	97.7	5 - 120		
Aldrin	ND	2.33			IS 13C12-Aldrin	81.0	5 - 120		
Oxychlordane	ND	8.71			IS 13C10-Oxychlordane	81.7	23 - 135		
cis-Heptachlor Epoxide	ND	5.58			IS 13C10-cis-Heptachlor Epoxide	82.0	27 - 137		
trans-Heptachlor Epoxide	ND	23.0			IS 13C10-trans-Chlordane (gamma)	75.5	21 - 132		
trans-Chlordane (gamma)	ND	7.86			IS 13C10-trans-Nonachlor	81.3	14 - 136		
trans-Nonachlor	ND	6.44			IS 13C9-Endosulfan I (alpha)	65.1	15 - 148		
cis-Chlordane (alpha)	ND	6.45			IS 13C12-2,4'-DDE	58.8	47 - 160		
Endosulfan I (alpha)	ND	12.1			IS 13C12-4,4'-DDE	79.5	47 - 160		
2,4'-DDE	ND	7.73			IS 13C12-Dieldrin	71.9	40 - 151		
4,4'-DDE	ND	7.18			IS 13C12-Endrin	73.4	35 - 155		
Dieldrin	4.08			J	IS 13C10-cis-Nonachlor	70.1	36 - 139		
Endrin	ND	4.86			IS 13C9-Endosulfan II (beta)	76.2	5 - 122		
cis-Nonachlor	ND	5.01			IS 13C12-2,4'-DDD	80.9	5 - 199		
Endosulfan II (beta)	ND	17.4			IS 13C12-2,4'-DDT	82.3	5 - 199		
2,4'-DDD	ND	14.0			IS 13C12-4,4'-DDD	86.1	5 - 120		
2,4'-DDT	ND	22.4			IS 13C12-4,4'-DDT	96.3	5 - 120		
4,4'-DDD	ND	15.4			IS 13C9-Endosulfan Sulfate	91.7	15 - 148		
4,4'-DDT	ND	23.1			IS 13C12-Methoxychlor	104	5 - 120		
Endosulfan Sulfate	ND	14.5			IS 13C10-Mirex	83.2	5 - 120		
4,4'-Methoxychlor	ND	3.00			IS 13C12-Endrin Aldehyde	60.3	15 - 148		
Mirex	ND	1.61			IS 13C12-Endrin Ketone	99.2	15 - 148		
Endrin Aldehyde	ND	13.1							
Endrin Ketone	ND	11.9							

DL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL - Lower control limit - upper control limit

Sample ID: OPR

EPA Method 1699

Matrix: Aqueous		QC Batch: B9L0133			Lab Sample: B9L0133-BS1			
Sample Size: 1.00 L		Date Extracted: 12-Dec-2019 6:15			Date Analyzed: 31-Dec-19 16:00 Column: ZB-50			
Analyte	Amt Found (pg/L)	Spike Amt	%R	Limits	Labeled Standard		%R	LCL-UCL
Hexachlorobenzene	997	1000	99.7	50 - 120	IS	13C6-Hexachlorobenzene	49.9	5 - 120
alpha-BHC	991	1000	99.1	50 - 120	IS	13C6-alpha-BHC	82.5	17 - 141
Lindane (gamma-BHC)	994	1000	99.4	50 - 120	IS	13C6-Lindane (gamma-BHC)	83.0	5 - 124
beta-BHC	1010	1000	101	50 - 120	IS	13C6-beta-BHC	82.3	17 - 141
delta-BHC	988	1000	98.8	50 - 120	IS	13C6-delta-BHC	82.2	16 - 150
Heptachlor	889	1000	88.9	50 - 120	IS	13C10-Heptachlor	136	5 - 128
Aldrin	954	1000	95.4	50 - 120	IS	13C12-Aldrin	102	5 - 126
Oxychlordane	894	1000	89.4	50 - 120	IS	13C10-Oxychlordane	117	5 - 144
cis-Heptachlor Epoxide	902	1000	90.2	50 - 120	IS	13C10-cis-Heptachlor Epoxide	114	8 - 146
trans-Heptachlor Epoxide	901	1000	90.1	50 - 120	IS	13C10-trans-Chlordane (gamma)	100	15 - 144
trans-Chlordane (gamma)	986	1000	98.6	50 - 120	IS	13C10-trans-Nonachlor	109	13 - 149
trans-Nonachlor	974	1000	97.4	50 - 120	IS	13C9-Endosulfan I (alpha)	98.1	5 - 144
cis-Chlordane (alpha)	763	1000	76.3	50 - 120	IS	13C12-2,4'-DDE	86.9	26 - 169
Endosulfan I (alpha)	923	1000	92.3	50 - 120	IS	13C12-4,4'-DDE	105	26 - 169
2,4'-DDE	903	1000	90.3	24 - 123	IS	13C12-Dieldrin	93.2	19 - 161
4,4'-DDE	885	1000	88.5	50 - 120	IS	13C12-Endrin	110	20 - 157
Dieldrin	946	1000	94.6	50 - 120	IS	13C10-cis-Nonachlor	95.7	17 - 154
Endrin	980	1000	98.0	50 - 120	IS	13C9-Endosulfan II (beta)	110	5 - 120
cis-Nonachlor	978	1000	97.8	50 - 120	IS	13C12-2,4'-DDD	107	14 - 200
Endosulfan II (beta)	864	1000	86.4	5 - 200	IS	13C12-2,4'-DDT	114	14 - 200
2,4'-DDD	1010	1000	101	50 - 120	IS	13C12-4,4'-DDD	118	14 - 200
2,4'-DDT	1090	1000	109	50 - 120	IS	13C12-4,4'-DDT	133	13 - 200
4,4'-DDD	1010	1000	101	42 - 120	IS	13C9-Endosulfan Sulfate	108	5 - 144
4,4'-DDT	1010	1000	101	50 - 120	IS	13C12-Methoxychlor	136	8 - 200
Endosulfan Sulfate	944	1000	94.4	50 - 120	IS	13C10-Mirex	106	5 - 138
4,4'-Methoxychlor	987	1000	98.7	50 - 120	IS	13C12-Endrin Aldehyde	96.4	5 - 144
Mirex	998	1000	99.8	50 - 120	IS	13C12-Endrin Ketone	130	5 - 144
Endrin Aldehyde	921	1000	92.1	50 - 134				
Endrin Ketone	928	1000	92.8	50 - 134				

LCL-UCL - Lower control limit - upper control limit

Sample ID: TS2-I-191207

EPA Method 1699

Client Data			Sample Data		Laboratory Data			
Name:	CDIM Engineering		Matrix:	Water	Lab Sample:	1904267-01	Date Received:	09-Dec-2019 7:16
Project:	LRTC Industrial Stormwater 101-004		Sample Size:	1.04 L	QC Batch:	B9L0133	Date Extracted:	12-Dec-2019 6:15
Date Collected:	07-Dec-2019 8:35				Date Analyzed:	31-Dec-19 20:06 Column: ZB-50		
Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
Hexachlorobenzene	1010			B	IS 13C6-Hexachlorobenzene	80.3	5 - 120	
alpha-BHC	51.3				IS 13C6-alpha-BHC	76.5	32 - 130	
Lindane (gamma-BHC)	69.5				IS 13C6-Lindane (gamma-BHC)	85.0	11 - 120	
beta-BHC	54.7				IS 13C6-beta-BHC	71.6	32 - 130	
delta-BHC	ND	12.5			IS 13C6-delta-BHC	72.3	36 - 137	
Heptachlor	53.7				IS 13C10-Heptachlor	153	5 - 120	H
Aldrin	10.3			J	IS 13C12-Aldrin	96.7	5 - 120	
Oxychlordane	ND	30.8			IS 13C10-Oxychlordane	86.9	23 - 135	
cis-Heptachlor Epoxide	ND		77.0		IS 13C10-cis-Heptachlor Epoxide	80.0	27 - 137	
trans-Heptachlor Epoxide	ND		245		IS 13C10-trans-Chlordane (gamma)	65.0	21 - 132	
trans-Chlordane (gamma)	912				IS 13C10-trans-Nonachlor	72.5	14 - 136	
trans-Nonachlor	497				IS 13C9-Endosulfan I (alpha)	81.5	15 - 148	
cis-Chlordane (alpha)	913				IS 13C12-2,4'-DDE	68.2	47 - 160	
Endosulfan I (alpha)	ND	36.0			IS 13C12-4,4'-DDE	68.4	47 - 160	
2,4'-DDE	326				IS 13C12-Dieldrin	67.7	40 - 151	
4,4'-DDE	5120				IS 13C12-Endrin	85.2	35 - 155	
Dieldrin	1590			B	IS 13C10-cis-Nonachlor	54.4	36 - 139	
Endrin	923				IS 13C9-Endosulfan II (beta)	80.0	5 - 122	
cis-Nonachlor	133				IS 13C12-2,4'-DDD	91.1	5 - 199	
Endosulfan II (beta)	ND	123			IS 13C12-2,4'-DDT	91.9	5 - 199	
2,4'-DDD	2280				IS 13C12-4,4'-DDD	84.2	5 - 120	
2,4'-DDT	5060				IS 13C12-4,4'-DDT	96.6	5 - 120	
4,4'-DDD	3850				IS 13C9-Endosulfan Sulfate	77.1	15 - 148	
4,4'-DDT	11100				IS 13C12-Methoxychlor	81.1	5 - 120	
Endosulfan Sulfate	ND	91.1			IS 13C10-Mirex	41.1	5 - 120	
4,4'-Methoxychlor	ND	120			IS 13C12-Endrin Aldehyde	66.2	15 - 148	
Mirex	ND	26.1			IS 13C12-Endrin Ketone	81.8	15 - 148	
Endrin Aldehyde	ND	81.0						
Endrin Ketone	624							

DL - Sample specific estimated detection limit

LCL-UCL - Lower control limit - upper control limit

EMPC - Estimated maximum possible concentration

DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
CRS	Cleanup Recovery Standard
D	Dilution
DL	Detection limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
IS	Internal Standard
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limit of Detection
LOQ	Limit of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
NA	Not applicable
ND	Not Detected
OPR	Ongoing Precision and Recovery sample
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
RL	Reporting Limit
TEQ	Toxic Equivalency
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	19-013-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777-23
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Massachusetts Department of Environmental Protection	N/A
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1521520
New Hampshire Environmental Accreditation Program	207718-B
New Jersey Department of Environmental Protection	190001
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-010
Pennsylvania Department of Environmental Protection	016
Texas Commission on Environmental Quality	T104704189-19-10
Vermont Department of Health	VT-4042
Virginia Department of General Services	10272
Washington Department of Ecology	C584-19
Wisconsin Department of Natural Resources	998036160

Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.

NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	Method
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	Method
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613/1613B
1,4-Dioxane (1,4-Diethyleneoxide) analysis by GC/HRMS	EPA 522
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	Method
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

Sample Log-In Checklist

 Page # 1 of 1

 Vista Work Order #: 1904267 TAT std

Samples Arrival:	Date/Time 12/09/19 0716	Initials: ajr	Location: WR-2
			Shelf/Rack: N/A
Delivered By:	<input checked="" type="radio"/> FedEx	<input type="radio"/> UPS	<input type="radio"/> On Trac
		<input type="radio"/> GSO	<input type="radio"/> DHL
		<input type="radio"/> Hand Delivered	<input type="radio"/> Other
Preservation:	<input checked="" type="radio"/> Ice	<input type="radio"/> Blue Ice	<input type="radio"/> Dry Ice
	<input type="radio"/> None		
Temp °C: 0.5 (uncorrected)	Probe used: <input checked="" type="radio"/> Y / <input type="radio"/> N		Thermometer ID: DT-4
Temp °C: 0.5 (corrected)			

	YES	NO	NA
Shipping Container(s) Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Custody Seals Intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Airbill <u> </u> Trk # <u>7786 9082 1950</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Container	Vista	<input checked="" type="radio"/> Client	Retain
		<input checked="" type="radio"/> Return	Dispose
Chain of Custody / Sample Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chain of Custody / Sample Documentation Complete?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Holding Time Acceptable?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Logged In:	Date/Time 12/09/19 0934	Initials: WWS	Location: WR-2
			Shelf/Rack: C-1, B-1
COC Anomaly/Sample Acceptance Form completed?			<input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>

Comments:

CoC/Label Reconciliation Report WO# 1904267

LabNumber	CoC Sample ID	SampleAlias ✓	Sample Date/Time	Container ✓	✓ BaseMatrix	Sample Comments ✓
1904267-01 A	TS2-I-191207	✓	07-Dec-19 08:35 ✓	Amber Glass NM Bottle, 1L	Aqueous	
1904267-01 B	TS2-I-191207	✓	07-Dec-19 08:35 ✓	Amber Glass NM Bottle, 1L	Aqueous	
1904267-01 C	TS2-I-191207	✓	07-Dec-19 08:35 ✓	Amber Glass NM Bottle, 1L	Aqueous	

Checkmarks indicate that information on the COC reconciled with the sample label.
Any discrepancies are noted in the following columns.

	Yes	No	NA
Sample Container Intact?	✓		
Sample Custody Seals Intact?			✓
Adequate Sample Volume?	✓		
Container Type Appropriate for Analysis(es)	✓		
Preservation Documented: Na2S2O3 Trizma <u>None</u> Other		✓	✓
If Chlorinated or Drinking Water Samples, Acceptable Preservation?			✓

Comments:

Verified by/Date: MUS 12/09/19



January 02, 2020

Vista Work Order No. 1904266

Mr. Scott Bourne
CDIM Engineering
45 Polk Street, 3rd Floor
San Francisco, CA 94102

Dear Mr. Bourne,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on December 09, 2019 under your Project Name 'LRTC Industrial Stormwater 101-004'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at mmaier@vista-analytical.com.

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier
Laboratory Director



Vista Analytical Laboratory certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Vista.

Vista Work Order No. 1904266

Case Narrative

Sample Condition on Receipt:

One water sample was received in good condition and within the method temperature requirements. The sample was received and stored securely in accordance with Vista standard operating procedures and EPA methodology.

Analytical Notes:

EPA Method 1699

The sample was extracted and analyzed for chlorinated pesticides by EPA Method 1699 using a ZB-50 GC column.

Holding Times

As requested, the three bottles of the sample were composited prior to extraction. Approximately one liter of the composite was extracted and analyzed within the method hold times.

Quality Control

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected above the sample quantitation limits in the Method Blank. The OPR recoveries were within the method acceptance criteria.

The labeled standard recoveries outside the method acceptance criteria are listed in the table below:

QC Anomalies

LabNumber	SampleName	Analysis	Analyte	Flag	%Rec
1904266-01	TS2-E-191207	EPA Method 1699	13C10-Heptachlor	H	152
B9L0133-BS1	B9L0133-BS1	EPA Method 1699	13C10-Heptachlor	H	136

H = Recovery was outside laboratory acceptance criteria.

TABLE OF CONTENTS

Case Narrative.....	1
Table of Contents.....	3
Sample Inventory.....	4
Analytical Results.....	5
Qualifiers.....	9
Certifications.....	10
Sample Receipt.....	13

Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
1904266-01	TS2-E-191207	07-Dec-19 08:45	09-Dec-19 07:16	Amber Glass NM Bottle, 1L Amber Glass NM Bottle, 1L Amber Glass NM Bottle, 1L

ANALYTICAL RESULTS

Sample ID: Method Blank					EPA Method 1699				
Matrix: Aqueous		QC Batch: B9L0133			Lab Sample: B9L0133-BLK1				
Sample Size: 1.00 L		Date Extracted: 12-Dec-2019 6:15			Date Analyzed: 31-Dec-19 18:29 Column: ZB-50				
Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers	
Hexachlorobenzene	10.3			J	IS 13C6-Hexachlorobenzene	32.1	5 - 120		
alpha-BHC	ND	5.45			IS 13C6-alpha-BHC	59.4	32 - 130		
Lindane (gamma-BHC)	ND	8.31			IS 13C6-Lindane (gamma-BHC)	60.0	11 - 120		
beta-BHC	ND	7.78			IS 13C6-beta-BHC	60.1	32 - 130		
delta-BHC	ND	6.25			IS 13C6-delta-BHC	60.6	36 - 137		
Heptachlor	ND	1.35			IS 13C10-Heptachlor	97.7	5 - 120		
Aldrin	ND	2.33			IS 13C12-Aldrin	81.0	5 - 120		
Oxychlordane	ND	8.71			IS 13C10-Oxychlordane	81.7	23 - 135		
cis-Heptachlor Epoxide	ND	5.58			IS 13C10-cis-Heptachlor Epoxide	82.0	27 - 137		
trans-Heptachlor Epoxide	ND	23.0			IS 13C10-trans-Chlordane (gamma)	75.5	21 - 132		
trans-Chlordane (gamma)	ND	7.86			IS 13C10-trans-Nonachlor	81.3	14 - 136		
trans-Nonachlor	ND	6.44			IS 13C9-Endosulfan I (alpha)	65.1	15 - 148		
cis-Chlordane (alpha)	ND	6.45			IS 13C12-2,4'-DDE	58.8	47 - 160		
Endosulfan I (alpha)	ND	12.1			IS 13C12-4,4'-DDE	79.5	47 - 160		
2,4'-DDE	ND	7.73			IS 13C12-Dieldrin	71.9	40 - 151		
4,4'-DDE	ND	7.18			IS 13C12-Endrin	73.4	35 - 155		
Dieldrin	4.08			J	IS 13C10-cis-Nonachlor	70.1	36 - 139		
Endrin	ND	4.86			IS 13C9-Endosulfan II (beta)	76.2	5 - 122		
cis-Nonachlor	ND	5.01			IS 13C12-2,4'-DDD	80.9	5 - 199		
Endosulfan II (beta)	ND	17.4			IS 13C12-2,4'-DDT	82.3	5 - 199		
2,4'-DDD	ND	14.0			IS 13C12-4,4'-DDD	86.1	5 - 120		
2,4'-DDT	ND	22.4			IS 13C12-4,4'-DDT	96.3	5 - 120		
4,4'-DDD	ND	15.4			IS 13C9-Endosulfan Sulfate	91.7	15 - 148		
4,4'-DDT	ND	23.1			IS 13C12-Methoxychlor	104	5 - 120		
Endosulfan Sulfate	ND	14.5			IS 13C10-Mirex	83.2	5 - 120		
4,4'-Methoxychlor	ND	3.00			IS 13C12-Endrin Aldehyde	60.3	15 - 148		
Mirex	ND	1.61			IS 13C12-Endrin Ketone	99.2	15 - 148		
Endrin Aldehyde	ND	13.1							
Endrin Ketone	ND	11.9							

DL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

LCL-UCL - Lower control limit - upper control limit

Sample ID: OPR

EPA Method 1699

Matrix: Aqueous	QC Batch: B9L0133	Lab Sample: B9L0133-BS1					
Sample Size: 1.00 L	Date Extracted: 12-Dec-2019 6:15	Date Analyzed: 31-Dec-19 16:00 Column: ZB-50					
Analyte	Amt Found (pg/L)	Spike Amt	%R	Limits	Labeled Standard	%R	LCL-UCL
Hexachlorobenzene	997	1000	99.7	50 - 120	IS 13C6-Hexachlorobenzene	49.9	5 - 120
alpha-BHC	991	1000	99.1	50 - 120	IS 13C6-alpha-BHC	82.5	17 - 141
Lindane (gamma-BHC)	994	1000	99.4	50 - 120	IS 13C6-Lindane (gamma-BHC)	83.0	5 - 124
beta-BHC	1010	1000	101	50 - 120	IS 13C6-beta-BHC	82.3	17 - 141
delta-BHC	988	1000	98.8	50 - 120	IS 13C6-delta-BHC	82.2	16 - 150
Heptachlor	889	1000	88.9	50 - 120	IS 13C10-Heptachlor	136	5 - 128
Aldrin	954	1000	95.4	50 - 120	IS 13C12-Aldrin	102	5 - 126
Oxychlordane	894	1000	89.4	50 - 120	IS 13C10-Oxychlordane	117	5 - 144
cis-Heptachlor Epoxide	902	1000	90.2	50 - 120	IS 13C10-cis-Heptachlor Epoxide	114	8 - 146
trans-Heptachlor Epoxide	901	1000	90.1	50 - 120	IS 13C10-trans-Chlordane (gamma)	100	15 - 144
trans-Chlordane (gamma)	986	1000	98.6	50 - 120	IS 13C10-trans-Nonachlor	109	13 - 149
trans-Nonachlor	974	1000	97.4	50 - 120	IS 13C9-Endosulfan I (alpha)	98.1	5 - 144
cis-Chlordane (alpha)	763	1000	76.3	50 - 120	IS 13C12-2,4'-DDE	86.9	26 - 169
Endosulfan I (alpha)	923	1000	92.3	50 - 120	IS 13C12-4,4'-DDE	105	26 - 169
2,4'-DDE	903	1000	90.3	24 - 123	IS 13C12-Dieldrin	93.2	19 - 161
4,4'-DDE	885	1000	88.5	50 - 120	IS 13C12-Endrin	110	20 - 157
Dieldrin	946	1000	94.6	50 - 120	IS 13C10-cis-Nonachlor	95.7	17 - 154
Endrin	980	1000	98.0	50 - 120	IS 13C9-Endosulfan II (beta)	110	5 - 120
cis-Nonachlor	978	1000	97.8	50 - 120	IS 13C12-2,4'-DDD	107	14 - 200
Endosulfan II (beta)	864	1000	86.4	5 - 200	IS 13C12-2,4'-DDT	114	14 - 200
2,4'-DDD	1010	1000	101	50 - 120	IS 13C12-4,4'-DDD	118	14 - 200
2,4'-DDT	1090	1000	109	50 - 120	IS 13C12-4,4'-DDT	133	13 - 200
4,4'-DDD	1010	1000	101	42 - 120	IS 13C9-Endosulfan Sulfate	108	5 - 144
4,4'-DDT	1010	1000	101	50 - 120	IS 13C12-Methoxychlor	136	8 - 200
Endosulfan Sulfate	944	1000	94.4	50 - 120	IS 13C10-Mirex	106	5 - 138
4,4'-Methoxychlor	987	1000	98.7	50 - 120	IS 13C12-Endrin Aldehyde	96.4	5 - 144
Mirex	998	1000	99.8	50 - 120	IS 13C12-Endrin Ketone	130	5 - 144
Endrin Aldehyde	921	1000	92.1	50 - 134			
Endrin Ketone	928	1000	92.8	50 - 134			

LCL-UCL - Lower control limit - upper control limit

Sample ID: TS2-E-191207**EPA Method 1699**

Client Data			Sample Data		Laboratory Data			
Name:	CDIM Engineering		Matrix:	Water	Lab Sample:	1904266-01	Date Received:	09-Dec-2019 7:16
Project:	LRTC Industrial Stormwater 101-004		Sample Size:	1.03 L	QC Batch:	B9L0133	Date Extracted:	12-Dec-2019 6:15
Date Collected:	07-Dec-2019 8:45				Date Analyzed:	31-Dec-19 20:55	Column: ZB-50	
Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
Hexachlorobenzene	34.7			J, B	IS 13C6-Hexachlorobenzene	77.1	5 - 120	
alpha-BHC	39.6				IS 13C6-alpha-BHC	86.4	32 - 130	
Lindane (gamma-BHC)	59.0				IS 13C6-Lindane (gamma-BHC)	93.3	11 - 120	
beta-BHC	68.4				IS 13C6-beta-BHC	91.5	32 - 130	
delta-BHC	ND	6.86			IS 13C6-delta-BHC	86.8	36 - 137	
Heptachlor	ND		4.10		IS 13C10-Heptachlor	152	5 - 120	H
Aldrin	ND	6.37			IS 13C12-Aldrin	103	5 - 120	
Oxychlordane	ND	23.3			IS 13C10-Oxychlordane	110	23 - 135	
cis-Heptachlor Epoxide	60.7				IS 13C10-cis-Heptachlor Epoxide	115	27 - 137	
trans-Heptachlor Epoxide	235				IS 13C10-trans-Chlordane (gamma)	93.0	21 - 132	
trans-Chlordane (gamma)	57.3				IS 13C10-trans-Nonachlor	97.2	14 - 136	
trans-Nonachlor	ND	19.7			IS 13C9-Endosulfan I (alpha)	86.8	15 - 148	
cis-Chlordane (alpha)	54.8				IS 13C12-2,4'-DDE	76.8	47 - 160	
Endosulfan I (alpha)	ND	35.0			IS 13C12-4,4'-DDE	99.3	47 - 160	
2,4'-DDE	ND	5.95			IS 13C12-Dieldrin	82.7	40 - 151	
4,4'-DDE	46.5				IS 13C12-Endrin	89.6	35 - 155	
Dieldrin	621			B	IS 13C10-cis-Nonachlor	75.9	36 - 139	
Endrin	226				IS 13C9-Endosulfan II (beta)	92.2	5 - 122	
cis-Nonachlor	ND	27.8			IS 13C12-2,4'-DDD	103	5 - 199	
Endosulfan II (beta)	ND		56.1		IS 13C12-2,4'-DDT	109	5 - 199	
2,4'-DDD	72.6				IS 13C12-4,4'-DDD	107	5 - 120	
2,4'-DDT	40.6				IS 13C12-4,4'-DDT	119	5 - 120	
4,4'-DDD	86.5				IS 13C9-Endosulfan Sulfate	89.6	15 - 148	
4,4'-DDT	76.6				IS 13C12-Methoxychlor	112	5 - 120	
Endosulfan Sulfate	ND	69.0			IS 13C10-Mirex	70.2	5 - 120	
4,4'-Methoxychlor	ND	9.59			IS 13C12-Endrin Aldehyde	59.9	15 - 148	
Mirex	ND	5.70			IS 13C12-Endrin Ketone	98.4	15 - 148	
Endrin Aldehyde	ND	45.3						
Endrin Ketone	381							

DL - Sample specific estimated detection limit

LCL-UCL - Lower control limit - upper control limit

EMPC - Estimated maximum possible concentration

DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
CRS	Cleanup Recovery Standard
D	Dilution
DL	Detection limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
IS	Internal Standard
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limit of Detection
LOQ	Limit of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
NA	Not applicable
ND	Not Detected
OPR	Ongoing Precision and Recovery sample
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
RL	Reporting Limit
TEQ	Toxic Equivalency
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	19-013-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777-23
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Massachusetts Department of Environmental Protection	N/A
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1521520
New Hampshire Environmental Accreditation Program	207718-B
New Jersey Department of Environmental Protection	190001
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-010
Pennsylvania Department of Environmental Protection	016
Texas Commission on Environmental Quality	T104704189-19-10
Vermont Department of Health	VT-4042
Virginia Department of General Services	10272
Washington Department of Ecology	C584-19
Wisconsin Department of Natural Resources	998036160

Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.

NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	Method
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	Method
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613/1613B
1,4-Dioxane (1,4-Diethyleneoxide) analysis by GC/HRMS	EPA 522
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	Method
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A



DY RECORD ^{WWS} 1904266 ^{12/09/19} ~~1902466~~ 0.5°C

Sample Log-In Checklist

 Page # 1 of 1

 Vista Work Order #: 1904266

 TAT std

Samples Arrival:	Date/Time 12/09/19 0716		Initials: ajr		Location: WR-2		
					Shelf/Rack: N/A		
Delivered By:	<input checked="" type="radio"/> FedEx	<input type="radio"/> UPS	<input type="radio"/> On Trac	<input type="radio"/> GSO	<input type="radio"/> DHL	<input type="radio"/> Hand Delivered	<input type="radio"/> Other
Preservation:	<input checked="" type="radio"/> Ice		<input type="radio"/> Blue Ice		<input type="radio"/> Dry Ice		<input type="radio"/> None
Temp °C: 0.5 (uncorrected)			Probe used: Y / N		Thermometer ID: DT-4		
Temp °C: 0.5 (corrected)							

	YES	NO	NA
Shipping Container(s) Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Custody Seals Intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Airbill <u> </u> Trk # <u>7786 9082 1950</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Container <input checked="" type="radio"/> Vista <input type="radio"/> Client <input checked="" type="radio"/> Retain <input type="radio"/> Return <input type="radio"/> Dispose			
Chain of Custody / Sample Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chain of Custody / Sample Documentation Complete?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Holding Time Acceptable?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Logged In:	Date/Time 12/09/19 0901		Initials: WJS
			Location: WR-2
			Shelf/Rack: C-1, B-1
COC Anomaly/Sample Acceptance Form completed?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Comments:

CoC/Label Reconciliation Report WO# 1904266

LabNumber	CoC Sample ID	SampleAlias ✓	Sample Date/Time	Container ✓	BaseMatrix ✓	Sample Comments ✓
1904266-01 A	TS2-E-191207	<input checked="" type="checkbox"/>	07-Dec-19 08:45 <input checked="" type="checkbox"/>	Amber Glass NM Bottle, 1L	Aqueous	
1904266-01 B	TS2-E-191207	<input checked="" type="checkbox"/>	07-Dec-19 08:45 <input checked="" type="checkbox"/>	Amber Glass NM Bottle, 1L	Aqueous	
1904266-01 C	TS2-E-191207	<input checked="" type="checkbox"/>	07-Dec-19 08:45 <input checked="" type="checkbox"/>	Amber Glass NM Bottle, 1L	Aqueous	

Checkmarks indicate that information on the COC reconciled with the sample label.
Any discrepancies are noted in the following columns.

	Yes	No	NA
Sample Container Intact?	<input checked="" type="checkbox"/>		
Sample Custody Seals Intact?			<input checked="" type="checkbox"/>
Adequate Sample Volume?	<input checked="" type="checkbox"/>		
Container Type Appropriate for Analysis(es)	<input checked="" type="checkbox"/>		
Preservation Documented: Na2S2O3 Trizma <u>None</u> Other		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
If Chlorinated or Drinking Water Samples, Acceptable Preservation?			<input checked="" type="checkbox"/>

Comments:

Verified by/Date: WWS 12/09/19



February 03, 2020

Vista Work Order No. 1904366

Mr. Scott Bourne
CDIM Engineering
45 Polk Street, 3rd Floor
San Francisco, CA 94102

Dear Mr. Bourne,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on December 19, 2019 under your Project Name 'LRTC Industrial Stormwater / 101-004'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at mmaier@vista-analytical.com.

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier
Laboratory Director



Vista Analytical Laboratory certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Vista.

Vista Work Order No. 1904366

Case Narrative

Sample Condition on Receipt:

One water sample was received in good condition and within the method temperature requirements. The sample was received and stored securely in accordance with Vista standard operating procedures and EPA methodology.

Analytical Notes:

EPA Method 1699

As requested, the sample was composited prior to the aliquot taken for extraction.

The sample was extracted and analyzed for chlorinated pesticides by EPA Method 1699 using a ZB-50 GC column.

Holding Times

The sample was extracted and analyzed within the method hold times.

Quality Control

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected above the sample quantitation limits in the Method Blank. The OPR recoveries were within the method acceptance criteria.

The labeled standard recoveries outside the method acceptance criteria are listed in the table below:

QC Anomalies

LabNumber	SampleName	Analysis	Analyte	Flag	%Rec
1904366-01	TS2-I-191218	EPA Method 1699	13C12-2,4'-DDE	H	42.2
1904366-01	TS2-I-191218	EPA Method 1699	13C12-4,4'-DDE	H	39.9
1904366-01	TS2-I-191218	EPA Method 1699	13C10-cis-Nonachlor	H	30.8

H = Recovery was outside laboratory acceptance criteria.

TABLE OF CONTENTS

Case Narrative.....	1
Table of Contents.....	3
Sample Inventory.....	4
Analytical Results.....	5
Qualifiers.....	9
Certifications.....	10
Sample Receipt.....	13

Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
1904366-01	TS2-I-191218	18-Dec-19 10:55	19-Dec-19 10:23	Amber Glass NM Bottle, 1L Amber Glass NM Bottle, 1L Amber Glass NM Bottle, 1L

ANALYTICAL RESULTS

Sample ID: Method Blank					EPA Method 1699				
Matrix: Aqueous		QC Batch: B9L0235			Lab Sample: B9L0235-BLK1				
Sample Size: 1.00 L		Date Extracted: 23-Dec-2019 7:20			Date Analyzed: 03-Jan-20 12:06 Column: ZB-50				
Analyte	Conc. (pg/L)	RL	MDL	Qualifiers	Labeled Standard		%R	LCL-UCL	Qualifiers
Hexachlorobenzene	8.09	40.0	6.78	J	IS	13C6-Hexachlorobenzene	54.6	5 - 120	
alpha-BHC	ND	40.0	7.05		IS	13C6-alpha-BHC	87.8	32 - 130	
Lindane (gamma-BHC)	ND	40.0	4.96		IS	13C6-Lindane (gamma-BHC)	94.5	11 - 120	
beta-BHC	ND	40.0	6.99		IS	13C6-beta-BHC	99.6	32 - 130	
delta-BHC	ND	40.0	7.60		IS	13C6-delta-BHC	97.5	36 - 137	
Heptachlor	ND	40.0	14.0		IS	13C10-Heptachlor	105	5 - 120	
Aldrin	ND	40.0	8.72		IS	13C12-Aldrin	90.9	5 - 120	
Oxychlordane	ND	40.0	15.4		IS	13C10-Oxychlordane	105	23 - 135	
cis-Heptachlor Epoxide	ND	40.0	9.60		IS	13C10-cis-Heptachlor Epoxide	105	27 - 137	
trans-Heptachlor Epoxide	ND	40.0	32.3		IS	13C10-trans-Chlordane (gamma)	96.3	21 - 132	
trans-Chlordane (gamma)	ND	40.0	16.0		IS	13C10-trans-Nonachlor	98.4	14 - 136	
trans-Nonachlor	ND	40.0	15.0		IS	13C9-Endosulfan I (alpha)	79.5	15 - 148	
cis-Chlordane (alpha)	ND	40.0	22.7		IS	13C12-2,4'-DDE	83.6	47 - 160	
Endosulfan I (alpha)	ND	200	77.9		IS	13C12-4,4'-DDE	103	47 - 160	
2,4'-DDE	ND	40.0	25.2		IS	13C12-Dieldrin	96.9	40 - 151	
4,4'-DDE	ND	40.0	8.61		IS	13C12-Endrin	110	35 - 155	
Dieldrin	ND	40.0	10.5		IS	13C10-cis-Nonachlor	97.4	36 - 139	
Endrin	ND	40.0	19.6		IS	13C9-Endosulfan II (beta)	85.9	5 - 122	
cis-Nonachlor	ND	40.0	9.28		IS	13C12-2,4'-DDD	110	5 - 199	
Endosulfan II (beta)	ND	200	70.7		IS	13C12-2,4'-DDT	101	5 - 199	
2,4'-DDD	ND	40.0	9.64		IS	13C12-4,4'-DDD	108	5 - 120	
2,4'-DDT	ND	40.0	17.2		IS	13C12-4,4'-DDT	105	5 - 120	
4,4'-DDD	ND	40.0	13.8		IS	13C9-Endosulfan Sulfate	87.0	15 - 148	
4,4'-DDT	ND	40.0	17.2		IS	13C12-Methoxychlor	86.8	5 - 120	
Endosulfan Sulfate	ND	200	70.9		IS	13C10-Mirex	80.6	5 - 120	
4,4'-Methoxychlor	ND	40.0	67.9		IS	13C12-Endrin Aldehyde	60.5	15 - 148	
Mirex	ND	40.0	6.64		IS	13C12-Endrin Ketone	84.1	15 - 148	
Endrin Aldehyde	ND	200	70.9						
Endrin Ketone	ND	200	47.6						

MDL - Method detection limit

RL - Reporting limit

LCL-UCL - Lower control limit - upper control limit

Sample ID: OPR

EPA Method 1699

Matrix: Aqueous		QC Batch: B9L0235			Lab Sample: B9L0235-BS1			
Sample Size: 1.00 L		Date Extracted: 23-Dec-2019 7:20			Date Analyzed: 01-Feb-20 15:31 Column: ZB-50			
Analyte	Amt Found (pg/L)	Spike Amt	%R	Limits	Labeled Standard		%R	LCL-UCL
Hexachlorobenzene	1030	1000	103	50 - 120	IS	13C6-Hexachlorobenzene	64.2	5 - 120
alpha-BHC	1030	1000	103	50 - 120	IS	13C6-alpha-BHC	86.6	17 - 141
Lindane (gamma-BHC)	756	1000	75.6	50 - 120	IS	13C6-Lindane (gamma-BHC)	113	5 - 124
beta-BHC	998	1000	99.8	50 - 120	IS	13C6-beta-BHC	92.1	17 - 141
delta-BHC	1030	1000	103	50 - 120	IS	13C6-delta-BHC	89.0	16 - 150
Heptachlor	997	1000	99.7	50 - 120	IS	13C10-Heptachlor	105	5 - 128
Aldrin	992	1000	99.2	50 - 120	IS	13C12-Aldrin	98.1	5 - 126
Oxychlordane	993	1000	99.3	50 - 120	IS	13C10-Oxychlordane	115	5 - 144
cis-Heptachlor Epoxide	951	1000	95.1	50 - 120	IS	13C10-cis-Heptachlor Epoxide	120	8 - 146
trans-Heptachlor Epoxide	986	1000	98.6	50 - 120	IS	13C10-trans-Chlordane (gamma)	121	15 - 144
trans-Chlordane (gamma)	1020	1000	102	50 - 120	IS	13C10-trans-Nonachlor	118	13 - 149
trans-Nonachlor	997	1000	99.7	50 - 120	IS	13C9-Endosulfan I (alpha)	97.4	5 - 144
cis-Chlordane (alpha)	701	1000	70.1	50 - 120	IS	13C12-2,4'-DDE	73.4	26 - 169
Endosulfan I (alpha)	939	1000	93.9	50 - 120	IS	13C12-4,4'-DDE	115	26 - 169
2,4'-DDE	1010	1000	101	24 - 123	IS	13C12-Dieldrin	103	19 - 161
4,4'-DDE	966	1000	96.6	50 - 120	IS	13C12-Endrin	113	20 - 157
Dieldrin	1010	1000	101	50 - 120	IS	13C10-cis-Nonachlor	111	17 - 154
Endrin	1120	1000	112	50 - 120	IS	13C9-Endosulfan II (beta)	113	5 - 120
cis-Nonachlor	1020	1000	102	50 - 120	IS	13C12-2,4'-DDD	114	14 - 200
Endosulfan II (beta)	1030	1000	103	5 - 200	IS	13C12-2,4'-DDT	109	14 - 200
2,4'-DDD	1020	1000	102	50 - 120	IS	13C12-4,4'-DDD	112	14 - 200
2,4'-DDT	1080	1000	108	50 - 120	IS	13C12-4,4'-DDT	119	13 - 200
4,4'-DDD	1040	1000	104	42 - 120	IS	13C9-Endosulfan Sulfate	104	5 - 144
4,4'-DDT	1030	1000	103	50 - 120	IS	13C12-Methoxychlor	107	8 - 200
Endosulfan Sulfate	1040	1000	104	50 - 120	IS	13C10-Mirex	105	5 - 138
4,4'-Methoxychlor	1000	1000	100	50 - 120	IS	13C12-Endrin Aldehyde	62.2	5 - 144
Mirex	1030	1000	103	50 - 120	IS	13C12-Endrin Ketone	86.5	5 - 144
Endrin Aldehyde	951	1000	95.1	50 - 134				
Endrin Ketone	972	1000	97.2	50 - 134				

LCL-UCL - Lower control limit - upper control limit

Sample ID: TS2-I-191218					EPA Method 1699			
Client Data			Sample Data		Laboratory Data			
Name:	CDIM Engineering		Matrix:	Water	Lab Sample:	1904366-01	Date Received:	19-Dec-2019 10:23
Project:	LRTC Industrial Stormwater / 101-004		Sample Size:	0.946 L	QC Batch:	B9L0235	Date Extracted:	23-Dec-2019 7:20
Date Collected:	18-Dec-2019 10:55				Date Analyzed:	03-Jan-20 13:43 Column: ZB-50		
Analyte	Conc. (pg/L)	RL	MDL	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
Hexachlorobenzene	2130	42.3	7.17	B	IS 13C6-Hexachlorobenzene	88.4	5 - 120	
alpha-BHC	73.8	42.3	7.45		IS 13C6-alpha-BHC	62.2	32 - 130	
Lindane (gamma-BHC)	48.1	42.3	5.24		IS 13C6-Lindane (gamma-BHC)	88.3	11 - 120	
beta-BHC	45.4	42.3	7.39		IS 13C6-beta-BHC	64.8	32 - 130	
delta-BHC	ND	42.3	8.03		IS 13C6-delta-BHC	67.9	36 - 137	
Heptachlor	ND	42.3	14.8		IS 13C10-Heptachlor	89.3	5 - 120	
Aldrin	7.70	42.3	9.22	J	IS 13C12-Aldrin	69.0	5 - 120	
Oxychlordane	ND	42.3	16.3		IS 13C10-Oxychlordane	56.0	23 - 135	
cis-Heptachlor Epoxide	84.5	42.3	10.1		IS 13C10-cis-Heptachlor Epoxide	35.2	27 - 137	
trans-Heptachlor Epoxide	ND	42.3	34.1		IS 13C10-trans-Chlordane (gamma)	27.8	21 - 132	
trans-Chlordane (gamma)	736	42.3	16.9		IS 13C10-trans-Nonachlor	41.6	14 - 136	
trans-Nonachlor	425	42.3	15.9		IS 13C9-Endosulfan I (alpha)	39.3	15 - 148	
cis-Chlordane (alpha)	789	42.3	24.0		IS 13C12-2,4'-DDE	42.2	47 - 160	H
Endosulfan I (alpha)	ND	211	82.3		IS 13C12-4,4'-DDE	39.9	47 - 160	H
2,4'-DDE	252	42.3	26.6		IS 13C12-Dieldrin	52.0	40 - 151	
4,4'-DDE	4210	42.3	9.10		IS 13C12-Endrin	50.7	35 - 155	
Dieldrin	1100	42.3	11.1		IS 13C10-cis-Nonachlor	30.8	36 - 139	H
Endrin	341	42.3	20.7		IS 13C9-Endosulfan II (beta)	33.8	5 - 122	
cis-Nonachlor	ND	42.3	9.81		IS 13C12-2,4'-DDD	59.7	5 - 199	
Endosulfan II (beta)	ND	211	74.7		IS 13C12-2,4'-DDT	69.7	5 - 199	
2,4'-DDD	1640	42.3	10.2		IS 13C12-4,4'-DDD	45.6	5 - 120	
2,4'-DDT	2570	42.3	18.2		IS 13C12-4,4'-DDT	46.9	5 - 120	
4,4'-DDD	2780	42.3	14.6		IS 13C9-Endosulfan Sulfate	22.8	15 - 148	
4,4'-DDT	9600	42.3	18.2		IS 13C12-Methoxychlor	31.7	5 - 120	
Endosulfan Sulfate	ND	211	74.9		IS 13C10-Mirex	24.7	5 - 120	
4,4'-Methoxychlor	ND	42.3	71.8		IS 13C12-Endrin Aldehyde	30.7	15 - 148	
Mirex	ND	42.3	7.02		IS 13C12-Endrin Ketone	27.0	15 - 148	
Endrin Aldehyde	ND	211	74.9					
Endrin Ketone	ND	211	50.3					

MDL - Method detection limit

LCL-UCL - Lower control limit - upper control limit

RL - Reporting limit

DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
CRS	Cleanup Recovery Standard
D	Dilution
DL	Detection limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
IS	Internal Standard
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limit of Detection
LOQ	Limit of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
NA	Not applicable
ND	Not Detected
OPR	Ongoing Precision and Recovery sample
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
RL	Reporting Limit
TEQ	Toxic Equivalency
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	19-013-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777-23
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Massachusetts Department of Environmental Protection	N/A
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1521520
New Hampshire Environmental Accreditation Program	207718-B
New Jersey Department of Environmental Protection	190001
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-010
Pennsylvania Department of Environmental Protection	016
Texas Commission on Environmental Quality	T104704189-19-10
Vermont Department of Health	VT-4042
Virginia Department of General Services	10272
Washington Department of Ecology	C584-19
Wisconsin Department of Natural Resources	998036160

Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.

NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	Method
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	Method
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613/1613B
1,4-Dioxane (1,4-Diethyleneoxide) analysis by GC/HRMS	EPA 522
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	Method
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A



1904366 0.6°C

[illegible]

Sample Log-In Checklist

 Page # 1 of 1

 Vista Work Order #: 1904366

 TAT std

Samples Arrival:	Date/Time 12/19/19 1023		Initials: WWS		Location: WR-2		
					Shelf/Rack: N/A		
Delivered By:	<input checked="" type="radio"/> FedEx	<input type="radio"/> UPS	<input type="radio"/> On Trac	<input type="radio"/> GSO	<input type="radio"/> DHL	<input type="radio"/> Hand Delivered	<input type="radio"/> Other
Preservation:	<input checked="" type="radio"/> Ice		<input type="radio"/> Blue Ice		<input type="radio"/> Dry Ice		<input type="radio"/> None
Temp °C: 0.6 (uncorrected)	Probe used: Y / <input checked="" type="radio"/> N				Thermometer ID: IR-4		
Temp °C: 0.6 (corrected)							

	YES	NO	NA		
Shipping Container(s) Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Shipping Custody Seals Intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Airbill <u> </u> Trk # <u>7790 7457 9252</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Shipping Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Shipping Container	Vista	<input checked="" type="radio"/> Client	Retain	<input checked="" type="radio"/> Return	Dispose
Chain of Custody / Sample Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Chain of Custody / Sample Documentation Complete?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Holding Time Acceptable?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

Logged In:	Date/Time 12/19/19 1103	Initials: WWS	Location: WR-2
			Shelf/Rack: 2, C-4
COC Anomaly/Sample Acceptance Form completed?			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>

Comments:

CoC/Label Reconciliation Report WO# 1904366

LabNumber	CoC Sample ID	SampleAlias	Sample Date/Time	Container	BaseMatrix	Sample Comments
1904366-01	A TS2-I-191218	<input checked="" type="checkbox"/>	18-Dec-19 10:55	<input checked="" type="checkbox"/>	Amber Glass NM Bottle, 1L	Aqueous
1904366-01	B TS2-I-191218	<input checked="" type="checkbox"/>	18-Dec-19 10:55	<input checked="" type="checkbox"/>	Amber Glass NM Bottle, 1L	Aqueous
1904366-01	C TS2-I-191218	<input checked="" type="checkbox"/>	18-Dec-19 10:55	<input checked="" type="checkbox"/>	Amber Glass NM Bottle, 1L	Aqueous

Checkmarks indicate that information on the COC reconciled with the sample label.

Any discrepancies are noted in the following columns.

	Yes	No	NA	Comments:
Sample Container Intact?	<input checked="" type="checkbox"/>			
Sample Custody Seals Intact?			<input checked="" type="checkbox"/>	
Adequate Sample Volume?	<input checked="" type="checkbox"/>			
Container Type Appropriate for Analysis(es)	<input checked="" type="checkbox"/>			
Preservation Documented: Na2S2O3 Trizma <u>None</u> Other		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
If Chlorinated or Drinking Water Samples, Acceptable Preservation?			<input checked="" type="checkbox"/>	

Verified by/Date: HOG 12/19/19



February 03, 2020

Vista Work Order No. 1904367

Mr. Scott Bourne
CDIM Engineering
45 Polk Street, 3rd Floor
San Francisco, CA 94102

Dear Mr. Bourne,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on December 19, 2019 under your Project Name 'LRTC Industrial Stormwater / 101-004'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at mmaier@vista-analytical.com.

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier
Laboratory Director



Vista Analytical Laboratory certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Vista.

Vista Work Order No. 1904367**Case Narrative****Sample Condition on Receipt:**

One water sample was received in good condition and within the method temperature requirements. The sample was received and stored securely in accordance with Vista standard operating procedures and EPA methodology.

Analytical Notes:**EPA Method 1699**

As requested, the sample was composited prior to the aliquot taken for extraction.

The sample was extracted and analyzed for chlorinated pesticides by EPA Method 1699 using a ZB-50 GC column.

Holding Times

The sample was extracted and analyzed within the method hold times.

Quality Control

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected above the sample quantitation limits in the Method Blank. The OPR recoveries were within the method acceptance criteria.

Labeled standard recoveries for all QC and field samples were within method acceptance criteria.

TABLE OF CONTENTS

Case Narrative.....	1
Table of Contents.....	3
Sample Inventory.....	4
Analytical Results.....	5
Qualifiers.....	9
Certifications.....	10
Sample Receipt.....	13

Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
1904367-01	TS2-E-191218	18-Dec-19 10:49	19-Dec-19 10:23	Amber Glass NM Bottle, 1L Amber Glass NM Bottle, 1L Amber Glass NM Bottle, 1L

ANALYTICAL RESULTS

Sample ID: Method Blank					EPA Method 1699				
Matrix: Aqueous		QC Batch: B9L0235			Lab Sample: B9L0235-BLK1				
Sample Size: 1.00 L		Date Extracted: 23-Dec-2019 7:20			Date Analyzed: 03-Jan-20 12:06 Column: ZB-50				
Analyte	Conc. (pg/L)	RL	MDL	Qualifiers	Labeled Standard		%R	LCL-UCL	Qualifiers
Hexachlorobenzene	8.09	40.0	6.78	J	IS	13C6-Hexachlorobenzene	54.6	5 - 120	
alpha-BHC	ND	40.0	7.05		IS	13C6-alpha-BHC	87.8	32 - 130	
Lindane (gamma-BHC)	ND	40.0	4.96		IS	13C6-Lindane (gamma-BHC)	94.5	11 - 120	
beta-BHC	ND	40.0	6.99		IS	13C6-beta-BHC	99.6	32 - 130	
delta-BHC	ND	40.0	7.60		IS	13C6-delta-BHC	97.5	36 - 137	
Heptachlor	ND	40.0	14.0		IS	13C10-Heptachlor	105	5 - 120	
Aldrin	ND	40.0	8.72		IS	13C12-Aldrin	90.9	5 - 120	
Oxychlordane	ND	40.0	15.4		IS	13C10-Oxychlordane	105	23 - 135	
cis-Heptachlor Epoxide	ND	40.0	9.60		IS	13C10-cis-Heptachlor Epoxide	105	27 - 137	
trans-Heptachlor Epoxide	ND	40.0	32.3		IS	13C10-trans-Chlordane (gamma)	96.3	21 - 132	
trans-Chlordane (gamma)	ND	40.0	16.0		IS	13C10-trans-Nonachlor	98.4	14 - 136	
trans-Nonachlor	ND	40.0	15.0		IS	13C9-Endosulfan I (alpha)	79.5	15 - 148	
cis-Chlordane (alpha)	ND	40.0	22.7		IS	13C12-2,4'-DDE	83.6	47 - 160	
Endosulfan I (alpha)	ND	200	77.9		IS	13C12-4,4'-DDE	103	47 - 160	
2,4'-DDE	ND	40.0	25.2		IS	13C12-Dieldrin	96.9	40 - 151	
4,4'-DDE	ND	40.0	8.61		IS	13C12-Endrin	110	35 - 155	
Dieldrin	ND	40.0	10.5		IS	13C10-cis-Nonachlor	97.4	36 - 139	
Endrin	ND	40.0	19.6		IS	13C9-Endosulfan II (beta)	85.9	5 - 122	
cis-Nonachlor	ND	40.0	9.28		IS	13C12-2,4'-DDD	110	5 - 199	
Endosulfan II (beta)	ND	200	70.7		IS	13C12-2,4'-DDT	101	5 - 199	
2,4'-DDD	ND	40.0	9.64		IS	13C12-4,4'-DDD	108	5 - 120	
2,4'-DDT	ND	40.0	17.2		IS	13C12-4,4'-DDT	105	5 - 120	
4,4'-DDD	ND	40.0	13.8		IS	13C9-Endosulfan Sulfate	87.0	15 - 148	
4,4'-DDT	ND	40.0	17.2		IS	13C12-Methoxychlor	86.8	5 - 120	
Endosulfan Sulfate	ND	200	70.9		IS	13C10-Mirex	80.6	5 - 120	
4,4'-Methoxychlor	ND	40.0	67.9		IS	13C12-Endrin Aldehyde	60.5	15 - 148	
Mirex	ND	40.0	6.64		IS	13C12-Endrin Ketone	84.1	15 - 148	
Endrin Aldehyde	ND	200	70.9						
Endrin Ketone	ND	200	47.6						

MDL - Method detection limit

RL - Reporting limit

LCL-UCL - Lower control limit - upper control limit

Sample ID: OPR

EPA Method 1699

Matrix: Aqueous		QC Batch: B9L0235			Lab Sample: B9L0235-BS1			
Sample Size: 1.00 L		Date Extracted: 23-Dec-2019 7:20			Date Analyzed: 01-Feb-20 15:31 Column: ZB-50			
Analyte	Amt Found (pg/L)	Spike Amt	%R	Limits	Labeled Standard		%R	LCL-UCL
Hexachlorobenzene	1030	1000	103	50 - 120	IS	13C6-Hexachlorobenzene	64.2	5 - 120
alpha-BHC	1030	1000	103	50 - 120	IS	13C6-alpha-BHC	86.6	17 - 141
Lindane (gamma-BHC)	756	1000	75.6	50 - 120	IS	13C6-Lindane (gamma-BHC)	113	5 - 124
beta-BHC	998	1000	99.8	50 - 120	IS	13C6-beta-BHC	92.1	17 - 141
delta-BHC	1030	1000	103	50 - 120	IS	13C6-delta-BHC	89.0	16 - 150
Heptachlor	997	1000	99.7	50 - 120	IS	13C10-Heptachlor	105	5 - 128
Aldrin	992	1000	99.2	50 - 120	IS	13C12-Aldrin	98.1	5 - 126
Oxychlordane	993	1000	99.3	50 - 120	IS	13C10-Oxychlordane	115	5 - 144
cis-Heptachlor Epoxide	951	1000	95.1	50 - 120	IS	13C10-cis-Heptachlor Epoxide	120	8 - 146
trans-Heptachlor Epoxide	986	1000	98.6	50 - 120	IS	13C10-trans-Chlordane (gamma)	121	15 - 144
trans-Chlordane (gamma)	1020	1000	102	50 - 120	IS	13C10-trans-Nonachlor	118	13 - 149
trans-Nonachlor	997	1000	99.7	50 - 120	IS	13C9-Endosulfan I (alpha)	97.4	5 - 144
cis-Chlordane (alpha)	701	1000	70.1	50 - 120	IS	13C12-2,4'-DDE	73.4	26 - 169
Endosulfan I (alpha)	939	1000	93.9	50 - 120	IS	13C12-4,4'-DDE	115	26 - 169
2,4'-DDE	1010	1000	101	24 - 123	IS	13C12-Dieldrin	103	19 - 161
4,4'-DDE	966	1000	96.6	50 - 120	IS	13C12-Endrin	113	20 - 157
Dieldrin	1010	1000	101	50 - 120	IS	13C10-cis-Nonachlor	111	17 - 154
Endrin	1120	1000	112	50 - 120	IS	13C9-Endosulfan II (beta)	113	5 - 120
cis-Nonachlor	1020	1000	102	50 - 120	IS	13C12-2,4'-DDD	114	14 - 200
Endosulfan II (beta)	1030	1000	103	5 - 200	IS	13C12-2,4'-DDT	109	14 - 200
2,4'-DDD	1020	1000	102	50 - 120	IS	13C12-4,4'-DDD	112	14 - 200
2,4'-DDT	1080	1000	108	50 - 120	IS	13C12-4,4'-DDT	119	13 - 200
4,4'-DDD	1040	1000	104	42 - 120	IS	13C9-Endosulfan Sulfate	104	5 - 144
4,4'-DDT	1030	1000	103	50 - 120	IS	13C12-Methoxychlor	107	8 - 200
Endosulfan Sulfate	1040	1000	104	50 - 120	IS	13C10-Mirex	105	5 - 138
4,4'-Methoxychlor	1000	1000	100	50 - 120	IS	13C12-Endrin Aldehyde	62.2	5 - 144
Mirex	1030	1000	103	50 - 120	IS	13C12-Endrin Ketone	86.5	5 - 144
Endrin Aldehyde	951	1000	95.1	50 - 134				
Endrin Ketone	972	1000	97.2	50 - 134				

LCL-UCL - Lower control limit - upper control limit

Sample ID: TS2-E-191218					EPA Method 1699			
Client Data			Sample Data		Laboratory Data			
Name:	CDIM Engineering		Matrix:	Water	Lab Sample:	1904367-01	Date Received:	19-Dec-2019 10:23
Project:	LRTC Industrial Stormwater / 101-004		Sample Size:	0.952 L	QC Batch:	B9L0235	Date Extracted:	23-Dec-2019 7:20
Date Collected:	18-Dec-2019 10:49				Date Analyzed:	03-Jan-20 14:32 Column: ZB-50		
Analyte	Conc. (pg/L)	RL	MDL	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
Hexachlorobenzene	88.0	42.0	7.12	B	IS 13C6-Hexachlorobenzene	74.3	5 - 120	
alpha-BHC	57.4	42.0	7.40		IS 13C6-alpha-BHC	81.4	32 - 130	
Lindane (gamma-BHC)	62.8	42.0	5.21		IS 13C6-Lindane (gamma-BHC)	89.2	11 - 120	
beta-BHC	83.1	42.0	7.34		IS 13C6-beta-BHC	89.6	32 - 130	
delta-BHC	ND	42.0	7.98		IS 13C6-delta-BHC	85.6	36 - 137	
Heptachlor	ND	42.0	14.7		IS 13C10-Heptachlor	108	5 - 120	
Aldrin	ND	42.0	9.16		IS 13C12-Aldrin	82.5	5 - 120	
Oxychlordane	ND	42.0	16.2		IS 13C10-Oxychlordane	84.1	23 - 135	
cis-Heptachlor Epoxide	ND	42.0	10.1		IS 13C10-cis-Heptachlor Epoxide	77.7	27 - 137	
trans-Heptachlor Epoxide	218	42.0	33.9		IS 13C10-trans-Chlordane (gamma)	67.2	21 - 132	
trans-Chlordane (gamma)	61.7	42.0	16.8		IS 13C10-trans-Nonachlor	66.5	14 - 136	
trans-Nonachlor	39.6	42.0	15.8	J	IS 13C9-Endosulfan I (alpha)	60.3	15 - 148	
cis-Chlordane (alpha)	72.1	42.0	23.8		IS 13C12-2,4'-DDE	65.2	47 - 160	
Endosulfan I (alpha)	ND	210	81.8		IS 13C12-4,4'-DDE	88.5	47 - 160	
2,4'-DDE	17.7	42.0	26.5	J	IS 13C12-Dieldrin	74.7	40 - 151	
4,4'-DDE	134	42.0	9.04		IS 13C12-Endrin	81.8	35 - 155	
Dieldrin	556	42.0	11.0		IS 13C10-cis-Nonachlor	66.2	36 - 139	
Endrin	202	42.0	20.6		IS 13C9-Endosulfan II (beta)	61.7	5 - 122	
cis-Nonachlor	ND	42.0	9.74		IS 13C12-2,4'-DDD	97.3	5 - 199	
Endosulfan II (beta)	ND	210	74.2		IS 13C12-2,4'-DDT	101	5 - 199	
2,4'-DDD	102	42.0	10.1		IS 13C12-4,4'-DDD	90.5	5 - 120	
2,4'-DDT	109	42.0	18.1		IS 13C12-4,4'-DDT	98.0	5 - 120	
4,4'-DDD	149	42.0	14.5		IS 13C9-Endosulfan Sulfate	58.4	15 - 148	
4,4'-DDT	219	42.0	18.1		IS 13C12-Methoxychlor	64.5	5 - 120	
Endosulfan Sulfate	ND	210	74.4		IS 13C10-Mirex	49.7	5 - 120	
4,4'-Methoxychlor	ND	42.0	71.3		IS 13C12-Endrin Aldehyde	65.3	15 - 148	
Mirex	ND	42.0	6.97		IS 13C12-Endrin Ketone	58.5	15 - 148	
Endrin Aldehyde	ND	210	74.4					
Endrin Ketone	299	210	50.0					

MDL - Method detection limit

LCL-UCL - Lower control limit - upper control limit

RL - Reporting limit

DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
CRS	Cleanup Recovery Standard
D	Dilution
DL	Detection limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
IS	Internal Standard
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limit of Detection
LOQ	Limit of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
NA	Not applicable
ND	Not Detected
OPR	Ongoing Precision and Recovery sample
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
RL	Reporting Limit
TEQ	Toxic Equivalency
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	19-013-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777-23
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Massachusetts Department of Environmental Protection	N/A
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1521520
New Hampshire Environmental Accreditation Program	207718-B
New Jersey Department of Environmental Protection	190001
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-010
Pennsylvania Department of Environmental Protection	016
Texas Commission on Environmental Quality	T104704189-19-10
Vermont Department of Health	VT-4042
Virginia Department of General Services	10272
Washington Department of Ecology	C584-19
Wisconsin Department of Natural Resources	998036160

Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.

NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	Method
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	Method
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613/1613B
1,4-Dioxane (1,4-Diethyleneoxide) analysis by GC/HRMS	EPA 522
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	Method
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A



Specify analytic/prep method and detection limit in report.
Notify us of any anomalous peaks in GC or other scans.
Call immediately with any questions or problems.

COC Number:

Sample Specific Notes:

1

● = Samples received from a secured, locked area

Page 13 of 15

Sample Log-In Checklist

 Page # 1 of 1

Vista Work Order #:

1904367

TAT

std

Samples Arrival:	Date/Time 12/19/19 1023	Initials: WWS	Location: WR-2
			Shelf/Rack: N/A
Delivered By:	<input checked="" type="radio"/> FedEx	<input type="radio"/> UPS	<input type="radio"/> On Trac
	<input type="radio"/> GSO	<input type="radio"/> DHL	<input type="radio"/> Hand Delivered
Preservation:	<input checked="" type="radio"/> Ice	<input type="radio"/> Blue Ice	<input type="radio"/> Dry Ice
	<input type="radio"/> None		
Temp °C: 0.6 (uncorrected)	Probe used: Y / <input checked="" type="radio"/> N		Thermometer ID: IR-4
Temp °C: 0.6 (corrected)			

	YES	NO	NA
Shipping Container(s) Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Custody Seals Intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Airbill <u> </u> Trk # <u>7790 7457 9252</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Container	Vista	<input checked="" type="radio"/> Client	Retain
			<input checked="" type="radio"/> Return
			Dispose
Chain of Custody / Sample Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chain of Custody / Sample Documentation Complete?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Holding Time Acceptable?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Logged In:	Date/Time 12/19/19 1127	Initials: WWS	Location: WR-2
			Shelf/Rack: 2-2, C-4
COC Anomaly/Sample Acceptance Form completed?			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>

Comments:

CoC/Label Reconciliation Report WO# 1904367

LabNumber	CoC Sample ID	SampleAlias	Sample Date/Time	Container	BaseMatrix	Sample Comments
1904367-01	A TS2-E-191218	<input checked="" type="checkbox"/>	18-Dec-19 10:49	<input checked="" type="checkbox"/>	Amber Glass NM Bottle, 1L	Aqueous
1904367-01	B TS2-E-191218	<input checked="" type="checkbox"/>	18-Dec-19 10:49	<input checked="" type="checkbox"/>	Amber Glass NM Bottle, 1L	Aqueous
1904367-01	C TS2-E-191218	<input checked="" type="checkbox"/>	18-Dec-19 10:49	<input checked="" type="checkbox"/>	Amber Glass NM Bottle, 1L	Aqueous

Checkmarks indicate that information on the COC reconciled with the sample label.

Any discrepancies are noted in the following columns.

	Yes	No	NA	Comments:
Sample Container Intact?	<input checked="" type="checkbox"/>			
Sample Custody Seals Intact?			<input checked="" type="checkbox"/>	
Adequate Sample Volume?	<input checked="" type="checkbox"/>			
Container Type Appropriate for Analysis(es)	<input checked="" type="checkbox"/>			
Preservation Documented: Na2S2O3 Trizma <u>None</u> Other		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
If Chlorinated or Drinking Water Samples, Acceptable Preservation?			<input checked="" type="checkbox"/>	

Verified by/Date: HOG 12/19/19



February 07, 2020

Vista Work Order No. 2000097

Mr. Scott Bourne
CDIM Engineering
45 Polk Street, 3rd Floor
San Francisco, CA 94102

Dear Mr. Bourne,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on January 17, 2020 under your Project Name 'LRTC Industrial Stormwater'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at mmaier@vista-analytical.com.

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier
Laboratory Director



Vista Analytical Laboratory certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Vista.

Vista Work Order No. 2000097**Case Narrative****Sample Condition on Receipt:**

One water sample was received in good condition and within the method temperature requirements. The sample was received and stored securely in accordance with Vista standard operating procedures and EPA methodology. A sample ID discrepancy was noted upon sample receipt. The sample listed as "TS-I-200116" on the sample container label has been reported as "TS2-I-200116", as it was listed on the Chain of Custody.

Analytical Notes:**EPA Method 1699**

As requested, the sample was composited prior to taking an aliquot for extraction.

The sample was extracted and analyzed for chlorinated pesticides by EPA Method 1699 using a ZB-50 GC column.

Holding Times

The sample was extracted and analyzed within the method hold times.

Quality Control

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected above the sample quantitation limits in the Method Blank. The OPR recoveries were within the method acceptance criteria.

The labeled standard recoveries outside the method acceptance criteria are listed in the table below:

QC Anomalies

LabNumber	SampleName	Analysis	Analyte	Flag	%Rec
2000097-01	TS2-I-200116	EPA Method 1699	13C12-2,4'-DDE	H	42.3
2000097-01	TS2-I-200116	EPA Method 1699	13C12-4,4'-DDE	H	34.0
2000097-01	TS2-I-200116	EPA Method 1699	13C12-Dieldrin	H	29.2
2000097-01	TS2-I-200116	EPA Method 1699	13C12-Endrin	H	23.0
2000097-01	TS2-I-200116	EPA Method 1699	13C10-cis-Nonachlor	H	22.9
2000097-01	TS2-I-200116	EPA Method 1699	13C9-Endosulfan Sulfate	H	11.5
2000097-01	TS2-I-200116	EPA Method 1699	13C12-Endrin Aldehyde	H	7.40
2000097-01	TS2-I-200116	EPA Method 1699	13C12-Endrin Ketone	H	6.20

H = Recovery was outside laboratory acceptance criteria.

TABLE OF CONTENTS

Case Narrative.....	1
Table of Contents.....	3
Sample Inventory.....	4
Analytical Results.....	5
Qualifiers.....	9
Certifications.....	10
Sample Receipt.....	13

Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
2000097-01	TS2-I-200116	16-Jan-20 15:50	17-Jan-20 08:40	Amber Glass NM Bottle, 1L Amber Glass NM Bottle, 1L Amber Glass NM Bottle, 1L

ANALYTICAL RESULTS

Sample ID: Method Blank					EPA Method 1699				
Matrix: Aqueous		QC Batch: B0A0142			Lab Sample: B0A0142-BLK1				
Sample Size: 1.00 L		Date Extracted: 21-Jan-2020 6:14			Date Analyzed: 04-Feb-20 13:12 Column: ZB-50				
Analyte	Conc. (pg/L)	RL	MDL	Qualifiers	Labeled Standard		%R	LCL-UCL	Qualifiers
Hexachlorobenzene	17.5	40.0	6.78	J	IS	13C6-Hexachlorobenzene	67.2	5 - 120	
alpha-BHC	ND	40.0	7.05		IS	13C6-alpha-BHC	81.5	32 - 130	
Lindane (gamma-BHC)	ND	40.0	4.96		IS	13C6-Lindane (gamma-BHC)	92.3	11 - 120	
beta-BHC	ND	40.0	6.99		IS	13C6-beta-BHC	87.9	32 - 130	
delta-BHC	ND	40.0	7.60		IS	13C6-delta-BHC	80.9	36 - 137	
Heptachlor	ND	40.0	14.0		IS	13C10-Heptachlor	62.9	5 - 120	
Aldrin	ND	40.0	8.72		IS	13C12-Aldrin	70.3	5 - 120	
Oxychlordane	ND	40.0	15.4		IS	13C10-Oxychlordane	91.6	23 - 135	
cis-Heptachlor Epoxide	ND	40.0	9.60		IS	13C10-cis-Heptachlor Epoxide	89.2	27 - 137	
trans-Heptachlor Epoxide	ND	40.0	32.3		IS	13C10-trans-Chlordane (gamma)	112	21 - 132	
trans-Chlordane (gamma)	ND	40.0	16.0		IS	13C10-trans-Nonachlor	104	14 - 136	
trans-Nonachlor	ND	40.0	15.0		IS	13C9-Endosulfan I (alpha)	87.2	15 - 148	
cis-Chlordane (alpha)	ND	40.0	22.7		IS	13C12-2,4'-DDE	88.4	47 - 160	
Endosulfan I (alpha)	ND	200	77.9		IS	13C12-4,4'-DDE	86.0	47 - 160	
2,4'-DDE	ND	40.0	25.2		IS	13C12-Dieldrin	71.7	40 - 151	
4,4'-DDE	ND	40.0	8.61		IS	13C12-Endrin	81.2	35 - 155	
Dieldrin	ND	40.0	10.5		IS	13C10-cis-Nonachlor	91.4	36 - 139	
Endrin	ND	40.0	19.6		IS	13C9-Endosulfan II (beta)	77.9	5 - 122	
cis-Nonachlor	ND	40.0	9.28		IS	13C12-2,4'-DDD	62.1	5 - 199	
Endosulfan II (beta)	ND	200	70.7		IS	13C12-2,4'-DDT	53.3	5 - 199	
2,4'-DDD	ND	40.0	9.64		IS	13C12-4,4'-DDD	62.5	5 - 120	
2,4'-DDT	ND	40.0	17.2		IS	13C12-4,4'-DDT	58.8	5 - 120	
4,4'-DDD	ND	40.0	13.8		IS	13C9-Endosulfan Sulfate	85.1	15 - 148	
4,4'-DDT	ND	40.0	17.2		IS	13C12-Methoxychlor	59.4	5 - 120	
Endosulfan Sulfate	ND	200	70.9		IS	13C10-Mirex	94.2	5 - 120	
4,4'-Methoxychlor	ND	40.0	67.9		IS	13C12-Endrin Aldehyde	35.0	15 - 148	
Mirex	ND	40.0	6.64		IS	13C12-Endrin Ketone	59.1	15 - 148	
Endrin Aldehyde	ND	200	70.9						
Endrin Ketone	ND	200	47.6						

MDL - Method detection limit

RL - Reporting limit

LCL-UCL - Lower control limit - upper control limit

Sample ID: OPR

EPA Method 1699

Matrix: Aqueous		QC Batch: B0A0142	Lab Sample: B0A0142-BS1				
Sample Size: 1.00 L		Date Extracted: 21-Jan-2020 6:14	Date Analyzed: 04-Feb-20 11:32 Column: ZB-50				
Analyte	Amt Found (pg/L)	Spike Amt	%R	Limits	Labeled Standard	%R	LCL-UCL
Hexachlorobenzene	1060	1000	106	50 - 120	IS 13C6-Hexachlorobenzene	64.1	5 - 120
alpha-BHC	1040	1000	104	50 - 120	IS 13C6-alpha-BHC	82.7	17 - 141
Lindane (gamma-BHC)	945	1000	94.5	50 - 120	IS 13C6-Lindane (gamma-BHC)	93.7	5 - 124
beta-BHC	1030	1000	103	50 - 120	IS 13C6-beta-BHC	93.2	17 - 141
delta-BHC	1040	1000	104	50 - 120	IS 13C6-delta-BHC	89.1	16 - 150
Heptachlor	1020	1000	102	50 - 120	IS 13C10-Heptachlor	71.2	5 - 128
Aldrin	1040	1000	104	50 - 120	IS 13C12-Aldrin	81.2	5 - 126
Oxychlordane	1010	1000	101	50 - 120	IS 13C10-Oxychlordane	107	5 - 144
cis-Heptachlor Epoxide	985	1000	98.5	50 - 120	IS 13C10-cis-Heptachlor Epoxide	111	8 - 146
trans-Heptachlor Epoxide	1010	1000	101	50 - 120	IS 13C10-trans-Chlordane (gamma)	127	15 - 144
trans-Chlordane (gamma)	993	1000	99.3	50 - 120	IS 13C10-trans-Nonachlor	117	13 - 149
trans-Nonachlor	1040	1000	104	50 - 120	IS 13C9-Endosulfan I (alpha)	103	5 - 144
cis-Chlordane (alpha)	962	1000	96.2	50 - 120	IS 13C12-2,4'-DDE	99.7	26 - 169
Endosulfan I (alpha)	1000	1000	100	50 - 120	IS 13C12-4,4'-DDE	109	26 - 169
2,4'-DDE	1010	1000	101	24 - 123	IS 13C12-Dieldrin	84.9	19 - 161
4,4'-DDE	993	1000	99.3	50 - 120	IS 13C12-Endrin	94.2	20 - 157
Dieldrin	1050	1000	105	50 - 120	IS 13C10-cis-Nonachlor	113	17 - 154
Endrin	1100	1000	110	50 - 120	IS 13C9-Endosulfan II (beta)	91.1	5 - 120
cis-Nonachlor	1010	1000	101	50 - 120	IS 13C12-2,4'-DDD	83.5	14 - 200
Endosulfan II (beta)	1000	1000	100	5 - 200	IS 13C12-2,4'-DDT	69.9	14 - 200
2,4'-DDD	1050	1000	105	50 - 120	IS 13C12-4,4'-DDD	81.0	14 - 200
2,4'-DDT	1140	1000	114	50 - 120	IS 13C12-4,4'-DDT	73.0	13 - 200
4,4'-DDD	1050	1000	105	42 - 120	IS 13C9-Endosulfan Sulfate	82.7	5 - 144
4,4'-DDT	1050	1000	105	50 - 120	IS 13C12-Methoxychlor	61.4	8 - 200
Endosulfan Sulfate	971	1000	97.1	50 - 120	IS 13C10-Mirex	97.6	5 - 138
4,4'-Methoxychlor	1020	1000	102	50 - 120	IS 13C12-Endrin Aldehyde	35.8	5 - 144
Mirex	1040	1000	104	50 - 120	IS 13C12-Endrin Ketone	53.9	5 - 144
Endrin Aldehyde	1000	1000	100	50 - 134			
Endrin Ketone	971	1000	97.1	50 - 134			

LCL-UCL - Lower control limit - upper control limit

Sample ID: TS2-I-200116					EPA Method 1699			
Client Data			Sample Data		Laboratory Data			
Name:	CDIM Engineering		Matrix:	Water	Lab Sample:	2000097-01	Date Received:	17-Jan-2020 8:40
Project:	LRTC Industrial Stormwater		Sample Size:	1.03 L	QC Batch:	B0A0142	Date Extracted:	21-Jan-2020 6:14
Date Collected:	16-Jan-2020 15:50				Date Analyzed:	04-Feb-20 18:08 Column: ZB-50		
Analyte	Conc. (pg/L)	RL	MDL	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
Hexachlorobenzene	1990	38.7	6.56	B	IS 13C6-Hexachlorobenzene	81.7	5 - 120	
alpha-BHC	103	38.7	6.82		IS 13C6-alpha-BHC	61.4	32 - 130	
Lindane (gamma-BHC)	65.2	38.7	4.80		IS 13C6-Lindane (gamma-BHC)	73.0	11 - 120	
beta-BHC	74.1	38.7	6.76		IS 13C6-beta-BHC	44.9	32 - 130	
delta-BHC	ND	38.7	7.35		IS 13C6-delta-BHC	48.1	36 - 137	
Heptachlor	ND	38.7	13.5		IS 13C10-Heptachlor	19.9	5 - 120	
Aldrin	40.7	38.7	8.43		IS 13C12-Aldrin	22.8	5 - 120	
Oxychlordane	ND	38.7	14.9		IS 13C10-Oxychlordane	50.9	23 - 135	
cis-Heptachlor Epoxide	138	38.7	9.28		IS 13C10-cis-Heptachlor Epoxide	33.0	27 - 137	
trans-Heptachlor Epoxide	ND	38.7	31.2		IS 13C10-trans-Chlordane (gamma)	30.6	21 - 132	
trans-Chlordane (gamma)	1390	38.7	15.5		IS 13C10-trans-Nonachlor	39.4	14 - 136	
trans-Nonachlor	762	38.7	14.5		IS 13C9-Endosulfan I (alpha)	32.7	15 - 148	
cis-Chlordane (alpha)	1380	38.7	21.9		IS 13C12-2,4'-DDE	42.3	47 - 160	H
Endosulfan I (alpha)	ND	193	75.3		IS 13C12-4,4'-DDE	34.0	47 - 160	H
2,4'-DDE	869	38.7	24.4		IS 13C12-Dieldrin	29.2	40 - 151	H
4,4'-DDE	10900	38.7	8.33		IS 13C12-Endrin	23.0	35 - 155	H
Dieldrin	2930	38.7	10.2		IS 13C10-cis-Nonachlor	22.9	36 - 139	H
Endrin	1370	38.7	19.0		IS 13C9-Endosulfan II (beta)	21.3	5 - 122	
cis-Nonachlor	195	38.7	8.97		IS 13C12-2,4'-DDD	30.6	5 - 199	
Endosulfan II (beta)	ND	193	68.4		IS 13C12-2,4'-DDT	20.9	5 - 199	
2,4'-DDD	5160	38.7	9.32		IS 13C12-4,4'-DDD	20.9	5 - 120	
2,4'-DDT	7520	38.7	16.6		IS 13C12-4,4'-DDT	12.5	5 - 120	
4,4'-DDD	7810	38.7	13.3		IS 13C9-Endosulfan Sulfate	11.5	15 - 148	H
4,4'-DDT	18400	38.7	16.6		IS 13C12-Methoxychlor	5.60	5 - 120	
Endosulfan Sulfate	ND	193	68.6		IS 13C10-Mirex	17.8	5 - 120	
4,4'-Methoxychlor	ND	38.7	65.7		IS 13C12-Endrin Aldehyde	7.40	15 - 148	H
Mirex	ND	38.7	6.42		IS 13C12-Endrin Ketone	6.20	15 - 148	H
Endrin Aldehyde	ND	193	68.6					
Endrin Ketone	ND	193	46.0					

MDL - Method detection limit

LCL-UCL - Lower control limit - upper control limit

RL - Reporting limit

DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
CRS	Cleanup Recovery Standard
D	Dilution
DL	Detection limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
IS	Internal Standard
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limit of Detection
LOQ	Limit of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
NA	Not applicable
ND	Not Detected
OPR	Ongoing Precision and Recovery sample
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
RL	Reporting Limit
TEQ	Toxic Equivalency
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	19-013-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777-23
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Massachusetts Department of Environmental Protection	N/A
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1521520
New Hampshire Environmental Accreditation Program	207718-B
New Jersey Department of Environmental Protection	190001
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-010
Pennsylvania Department of Environmental Protection	016
Texas Commission on Environmental Quality	T104704189-19-10
Vermont Department of Health	VT-4042
Virginia Department of General Services	10272
Washington Department of Ecology	C584-19
Wisconsin Department of Natural Resources	998036160

Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.

NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	Method
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA TO-9A


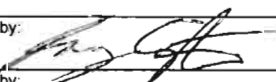
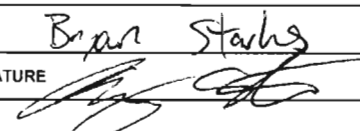
MATRIX: Biological Tissue	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	Method
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613/1613B
1,4-Dioxane (1,4-Diethyleneoxide) analysis by GC/HRMS	EPA 522
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	Method
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

2000097 0.3°C

		<h2 style="margin: 0;">CHAIN OF CUSTODY RECORD</h2>																																																																																																																																																																																																																																											
LABORATORY: Vista Analytical 1104 Windfield Way, El Dorado Hills CA 95762 (916) 673-1520 Karen Volpendesta			INSTRUCTIONS FOR LAB PERSONNEL: Please send analytic results, electronic deliverables and the original chain-of-custody form to: bas@cdimengineering.com , mec@cdimengineering.com sab@cdimengineering.com				Analysis Turnaround Time <input checked="" type="checkbox"/> Standard <input type="checkbox"/> Other _____ GeoTracker EDF required? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No LOCUS EDD required? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Report Results to: <input type="checkbox"/> RL <input checked="" type="checkbox"/> MDL Report soil results to: <input type="checkbox"/> wet weight (total) <input type="checkbox"/> dry weight																																																																																																																																																																																																																																						
CDIM CONTACT: CDIM Engineering 45 Polk Street, 3rd Floor San Francisco, California 94102			Project Manager: Bryan Starks Phone Number 415-498-0535 Sampled by: Sample date(s):				ANALYSIS REQUESTED							COC Number: Page <u>1</u> of <u>1</u> SDG number: Sample Specific Notes: Composite																																																																																																																																																																																																																															
PROJECT INFORMATION Job Name: LRTC Industrial Stormwater Job #: Address: 402 Wright Avenue, Richmond CA 94804												Pesticides (EPA 1699)		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>Lab ID</th> <th>Sample Identification</th> <th>Sample Date</th> <th>Sample Time</th> <th>Sample Matrix</th> <th># of Cont.</th> <th colspan="10"></th> </tr> <tr> <td></td> <td>TS2-I-200116</td> <td>1/16/20</td> <td>10:26</td> <td>W</td> <td>3</td> <td>X</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr><td> </td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td> </td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td> </td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td> </td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td> </td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td> </td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td> </td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td> </td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>										Lab ID	Sample Identification	Sample Date	Sample Time	Sample Matrix	# of Cont.												TS2-I-200116	1/16/20	10:26	W	3	X																																																																																																																																																																																															
Lab ID	Sample Identification	Sample Date	Sample Time	Sample Matrix	# of Cont.																																																																																																																																																																																																																																								
	TS2-I-200116	1/16/20	10:26	W	3	X																																																																																																																																																																																																																																							
Field Filtered (X):																																																																																																																																																																																																																																													
Preservation Used: 1= Ice, 2= HCl; 3= H ₂ SO ₄ ; 4=HNO ₃ ; 5=NaOH; 6= Other _____						1																																																																																																																																																																																																																																							
Special Instructions/QC Requirements & Comments: Level II Report. Report with reporting limit and method detection limit. Analyze and report only the metals listed above.																																																																																																																																																																																																																																													
Relinquished by: 		Company: <u>CDIM</u>		Date/Time: <u>1/16/20 16:00</u>		Received by: <u>Hayden Gann</u>		Company: <u>VAL</u>		Date/Time: <u>01/17/2020 08:40</u>																																																																																																																																																																																																																																			
Relinquished by: _____		Company: _____		Date/Time: _____		Received by: _____		Company: _____		Date/Time: _____																																																																																																																																																																																																																																			
Relinquished by: _____		Company: _____		Date/Time: _____		Received by: _____		Company: _____		Date/Time: _____																																																																																																																																																																																																																																			
x = Samples released to a secured, locked area. • = Samples received from a secured, locked area																																																																																																																																																																																																																																													
SAMPLERS NAME <u>Bryan Starks</u>						MOBILE # <u>808 256-9230</u>																																																																																																																																																																																																																																							
SAMPLERS SIGNATURE 						DATE / TIME <u>1/16/20 1400</u>																																																																																																																																																																																																																																							

Sample Log-In Checklist

 Page # 1 of 1

 Vista Work Order #: 2000097

 TAT Std

Samples Arrival:	Date/Time <u>01/17/2020 08:40</u>		Initials: <u>HOG</u>		Location: <u>WR-2</u>		
	Shelf/Rack: <u>NA</u>						
Delivered By:	<input checked="" type="checkbox"/> FedEx	<input type="checkbox"/> UPS	<input type="checkbox"/> On Trac	<input type="checkbox"/> GSO	<input type="checkbox"/> DHL	<input type="checkbox"/> Hand Delivered	<input type="checkbox"/> Other
Preservation:	<input checked="" type="checkbox"/> Ice		<input type="checkbox"/> Blue Ice		<input type="checkbox"/> Dry Ice		<input type="checkbox"/> None
Temp °C: <u>0.3</u> (uncorrected)	Probe used: Y / <input checked="" type="checkbox"/> N			Thermometer ID: <u>IR-4</u>			
Temp °C: <u>0.3</u> (corrected)							

	YES	NO	NA
Shipping Container(s) Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Custody Seals Intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Airbill <u>—</u> Trk # <u>7797 2727 8090</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Container	<input type="checkbox"/> Vista	<input checked="" type="checkbox"/> Client	<input type="checkbox"/> Retain
	<input type="checkbox"/> Return	<input type="checkbox"/> Dispose	
Chain of Custody / Sample Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chain of Custody / Sample Documentation Complete?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Holding Time Acceptable?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Logged In:	Date/Time <u>01/17/20 0920</u>	Initials: <u>KS</u>	Location: <u>WR-2</u>
	Shelf/Rack: <u>B-0</u>		
COC Anomaly/Sample Acceptance Form completed?			<input checked="" type="checkbox"/>

Comments:

CoC/Label Reconciliation Report WO# 2000097

LabNumber	CoC Sample ID	SampleAlias	Sample Date/Time	Container	BaseMatrix	Sample Comments
2000097-01	A TS2-I-200116	* <input type="checkbox"/>	16-Jan-20 15:50 <input checked="" type="checkbox"/>	Amber Glass NM Bottle, 1L	Aqueous	
2000097-01	B TS2-I-200116	* <input type="checkbox"/>	16-Jan-20 15:50 <input checked="" type="checkbox"/>	Amber Glass NM Bottle, 1L	Aqueous	
2000097-01	C TS2-I-200116	* <input type="checkbox"/>	16-Jan-20 15:50 <input checked="" type="checkbox"/>	Amber Glass NM Bottle, 1L	Aqueous	

Checkmarks indicate that information on the COC reconciled with the sample label.

Any discrepancies are noted in the following columns.

	Yes	No	NA
Sample Container Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample Custody Seals Intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Adequate Sample Volume?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Container Type Appropriate for Analysis(es)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Preservation Documented: Na2S2O3 Trizma None Other	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
If Chlorinated or Drinking Water Samples, Acceptable Preservation?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Comments: * COC Sample ID and label Sample ID do not match. Reconciled by date and time
 Ex: COC | label!
 TS2-I-200116 | TS-I-200116

Verified by/Date: SH 01/17/20



ANOMALY FORM

Vista Work Order 2000097

Initial/Date The following checked issues were noted during sample receipt and login:

- _____ ☐ 1. The samples were received out of temperature at (WI-PHT): _____
Was Ice present: Yes No Melted Blue Ice
- _____ ☐ 2. The Chain-of-Custody (CoC) was not relinquished properly.
- _____ ☐ 3. The CoC did not include collection time(s). 00:00 will be used unless notified otherwise.
- _____ ☐ 4. The sample(s) did not include a sample collection time. All or Sample Name: _____
- JS 01/17/20 ☒ 5. A sample ID discrepancy was found. See the Reconciliation report.
The CoC Sample ID will be used unless notified otherwise.
- _____ ☐ 6. A sample date and/or time discrepancy was found. See the Reconciliation report.
The CoC Sample date/time will be used unless notified otherwise.
- _____ ☐ 7. The CoC did not include a sample matrix. The following sample matrix will be used: _____
- _____ ☐ 8. Insufficient volume received for analysis. All or Sample Name: _____
- _____ ☐ 9. The backup bottle was received broken. Sample Name: _____
- _____ ☐ 10. CoC not received, illegible or destroyed.
- _____ ☐ 11. The sample(s) were received out of holding time. All or Sample Name: _____
- _____ ☐ 12. The CoC did not include an analysis. All or Sample Name: _____
- _____ ☐ 13. Sample(s) received without collection date. All or Sample Name: _____
- _____ ☐ 14. Sample(s) not received. All or Sample Name: _____
- _____ ☐ 15. Sample(s) received broken. All or Sample Name: _____
- _____ ☐ 16. An incorrect container-type was used. All or Sample Name: _____
- _____ ☐ 17. Other: _____

Bolded items require sign-off

Client Contacted: _____

Date of Contact: _____

Vista Client Manager: _____

Resolution: _____



February 07, 2020

Vista Work Order No. 2000096

Mr. Scott Bourne
CDIM Engineering
45 Polk Street, 3rd Floor
San Francisco, CA 94102

Dear Mr. Bourne,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on January 17, 2020 under your Project Name 'LRTC Industrial Stormwater'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at mmaier@vista-analytical.com.

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier
Laboratory Director



Vista Analytical Laboratory certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Vista.

Vista Work Order No. 2000096

Case Narrative

Sample Condition on Receipt:

One water sample was received in good condition and within the method temperature requirements. The sample was received and stored securely in accordance with Vista standard operating procedures and EPA methodology. A sample ID discrepancy was noted upon sample receipt. The sample listed as "TS-E-200116" on the sample container label has been reported as "TS2-E-200116", as it was listed on the Chain of Custody.

Analytical Notes:

EPA Method 1699

As requested, the sample was composited prior to taking an aliquot for extraction.

The sample was extracted and analyzed for chlorinated pesticides by EPA Method 1699 using a ZB-50 GC column.

Holding Times

The sample was extracted and analyzed within the method hold times.

Quality Control

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected above the sample quantitation limits in the Method Blank. The OPR recoveries were within the method acceptance criteria.

The labeled standard recoveries outside the method acceptance criteria are listed in the table below:

QC Anomalies

LabNumber	SampleName	Analysis	Analyte	Flag	%Rec
2000096-01	TS2-E-200116	EPA Method 1699	13C12-Endrin Aldehyde	H	14.4

H = Recovery was outside laboratory acceptance criteria.

TABLE OF CONTENTS

Case Narrative.....	1
Table of Contents.....	3
Sample Inventory.....	4
Analytical Results.....	5
Qualifiers.....	9
Certifications.....	10
Sample Receipt.....	13

Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
2000096-01	TS2-E-200116	16-Jan-20 10:20	17-Jan-20 08:40	Amber Glass NM Bottle, 1L Amber Glass NM Bottle, 1L Amber Glass NM Bottle, 1L

ANALYTICAL RESULTS

Sample ID: Method Blank					EPA Method 1699				
Matrix: Aqueous		QC Batch: B0A0142			Lab Sample: B0A0142-BLK1				
Sample Size: 1.00 L		Date Extracted: 21-Jan-2020 6:14			Date Analyzed: 04-Feb-20 13:12 Column: ZB-50				
Analyte	Conc. (pg/L)	RL	MDL	Qualifiers	Labeled Standard		%R	LCL-UCL	Qualifiers
Hexachlorobenzene	17.5	40.0	6.78	J	IS	13C6-Hexachlorobenzene	67.2	5 - 120	
alpha-BHC	ND	40.0	7.05		IS	13C6-alpha-BHC	81.5	32 - 130	
Lindane (gamma-BHC)	ND	40.0	4.96		IS	13C6-Lindane (gamma-BHC)	92.3	11 - 120	
beta-BHC	ND	40.0	6.99		IS	13C6-beta-BHC	87.9	32 - 130	
delta-BHC	ND	40.0	7.60		IS	13C6-delta-BHC	80.9	36 - 137	
Heptachlor	ND	40.0	14.0		IS	13C10-Heptachlor	62.9	5 - 120	
Aldrin	ND	40.0	8.72		IS	13C12-Aldrin	70.3	5 - 120	
Oxychlordane	ND	40.0	15.4		IS	13C10-Oxychlordane	91.6	23 - 135	
cis-Heptachlor Epoxide	ND	40.0	9.60		IS	13C10-cis-Heptachlor Epoxide	89.2	27 - 137	
trans-Heptachlor Epoxide	ND	40.0	32.3		IS	13C10-trans-Chlordane (gamma)	112	21 - 132	
trans-Chlordane (gamma)	ND	40.0	16.0		IS	13C10-trans-Nonachlor	104	14 - 136	
trans-Nonachlor	ND	40.0	15.0		IS	13C9-Endosulfan I (alpha)	87.2	15 - 148	
cis-Chlordane (alpha)	ND	40.0	22.7		IS	13C12-2,4'-DDE	88.4	47 - 160	
Endosulfan I (alpha)	ND	200	77.9		IS	13C12-4,4'-DDE	86.0	47 - 160	
2,4'-DDE	ND	40.0	25.2		IS	13C12-Dieldrin	71.7	40 - 151	
4,4'-DDE	ND	40.0	8.61		IS	13C12-Endrin	81.2	35 - 155	
Dieldrin	ND	40.0	10.5		IS	13C10-cis-Nonachlor	91.4	36 - 139	
Endrin	ND	40.0	19.6		IS	13C9-Endosulfan II (beta)	77.9	5 - 122	
cis-Nonachlor	ND	40.0	9.28		IS	13C12-2,4'-DDD	62.1	5 - 199	
Endosulfan II (beta)	ND	200	70.7		IS	13C12-2,4'-DDT	53.3	5 - 199	
2,4'-DDD	ND	40.0	9.64		IS	13C12-4,4'-DDD	62.5	5 - 120	
2,4'-DDT	ND	40.0	17.2		IS	13C12-4,4'-DDT	58.8	5 - 120	
4,4'-DDD	ND	40.0	13.8		IS	13C9-Endosulfan Sulfate	85.1	15 - 148	
4,4'-DDT	ND	40.0	17.2		IS	13C12-Methoxychlor	59.4	5 - 120	
Endosulfan Sulfate	ND	200	70.9		IS	13C10-Mirex	94.2	5 - 120	
4,4'-Methoxychlor	ND	40.0	67.9		IS	13C12-Endrin Aldehyde	35.0	15 - 148	
Mirex	ND	40.0	6.64		IS	13C12-Endrin Ketone	59.1	15 - 148	
Endrin Aldehyde	ND	200	70.9						
Endrin Ketone	ND	200	47.6						

MDL - Method detection limit

RL - Reporting limit

LCL-UCL - Lower control limit - upper control limit

Sample ID: OPR

EPA Method 1699

Matrix: Aqueous		QC Batch: B0A0142			Lab Sample: B0A0142-BS1			
Sample Size: 1.00 L		Date Extracted: 21-Jan-2020 6:14			Date Analyzed: 04-Feb-20 11:32 Column: ZB-50			
Analyte	Amt Found (pg/L)	Spike Amt	%R	Limits	Labeled Standard		%R	LCL-UCL
Hexachlorobenzene	1060	1000	106	50 - 120	IS	13C6-Hexachlorobenzene	64.1	5 - 120
alpha-BHC	1040	1000	104	50 - 120	IS	13C6-alpha-BHC	82.7	17 - 141
Lindane (gamma-BHC)	945	1000	94.5	50 - 120	IS	13C6-Lindane (gamma-BHC)	93.7	5 - 124
beta-BHC	1030	1000	103	50 - 120	IS	13C6-beta-BHC	93.2	17 - 141
delta-BHC	1040	1000	104	50 - 120	IS	13C6-delta-BHC	89.1	16 - 150
Heptachlor	1020	1000	102	50 - 120	IS	13C10-Heptachlor	71.2	5 - 128
Aldrin	1040	1000	104	50 - 120	IS	13C12-Aldrin	81.2	5 - 126
Oxychlordane	1010	1000	101	50 - 120	IS	13C10-Oxychlordane	107	5 - 144
cis-Heptachlor Epoxide	985	1000	98.5	50 - 120	IS	13C10-cis-Heptachlor Epoxide	111	8 - 146
trans-Heptachlor Epoxide	1010	1000	101	50 - 120	IS	13C10-trans-Chlordane (gamma)	127	15 - 144
trans-Chlordane (gamma)	993	1000	99.3	50 - 120	IS	13C10-trans-Nonachlor	117	13 - 149
trans-Nonachlor	1040	1000	104	50 - 120	IS	13C9-Endosulfan I (alpha)	103	5 - 144
cis-Chlordane (alpha)	962	1000	96.2	50 - 120	IS	13C12-2,4'-DDE	99.7	26 - 169
Endosulfan I (alpha)	1000	1000	100	50 - 120	IS	13C12-4,4'-DDE	109	26 - 169
2,4'-DDE	1010	1000	101	24 - 123	IS	13C12-Dieldrin	84.9	19 - 161
4,4'-DDE	993	1000	99.3	50 - 120	IS	13C12-Endrin	94.2	20 - 157
Dieldrin	1050	1000	105	50 - 120	IS	13C10-cis-Nonachlor	113	17 - 154
Endrin	1100	1000	110	50 - 120	IS	13C9-Endosulfan II (beta)	91.1	5 - 120
cis-Nonachlor	1010	1000	101	50 - 120	IS	13C12-2,4'-DDD	83.5	14 - 200
Endosulfan II (beta)	1000	1000	100	5 - 200	IS	13C12-2,4'-DDT	69.9	14 - 200
2,4'-DDD	1050	1000	105	50 - 120	IS	13C12-4,4'-DDD	81.0	14 - 200
2,4'-DDT	1140	1000	114	50 - 120	IS	13C12-4,4'-DDT	73.0	13 - 200
4,4'-DDD	1050	1000	105	42 - 120	IS	13C9-Endosulfan Sulfate	82.7	5 - 144
4,4'-DDT	1050	1000	105	50 - 120	IS	13C12-Methoxychlor	61.4	8 - 200
Endosulfan Sulfate	971	1000	97.1	50 - 120	IS	13C10-Mirex	97.6	5 - 138
4,4'-Methoxychlor	1020	1000	102	50 - 120	IS	13C12-Endrin Aldehyde	35.8	5 - 144
Mirex	1040	1000	104	50 - 120	IS	13C12-Endrin Ketone	53.9	5 - 144
Endrin Aldehyde	1000	1000	100	50 - 134				
Endrin Ketone	971	1000	97.1	50 - 134				

LCL-UCL - Lower control limit - upper control limit

Sample ID: TS2-E-200116					EPA Method 1699			
Client Data			Sample Data		Laboratory Data			
Name:	CDIM Engineering		Matrix:	Water	Lab Sample:	2000096-01	Date Received:	17-Jan-2020 8:40
Project:	LRTC Industrial Stormwater		Sample Size:	1.02 L	QC Batch:	B0A0142	Date Extracted:	21-Jan-2020 6:14
Date Collected:	16-Jan-2020 10:20				Date Analyzed:	04-Feb-20 17:18 Column: ZB-50		
Analyte	Conc. (pg/L)	RL	MDL	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
Hexachlorobenzene	434	39.2	6.65	B	IS 13C6-Hexachlorobenzene	66.3	5 - 120	
alpha-BHC	57.0	39.2	6.91		IS 13C6-alpha-BHC	78.0	32 - 130	
Lindane (gamma-BHC)	48.7	39.2	4.86		IS 13C6-Lindane (gamma-BHC)	81.1	11 - 120	
beta-BHC	64.6	39.2	6.85		IS 13C6-beta-BHC	78.0	32 - 130	
delta-BHC	ND	39.2	7.45		IS 13C6-delta-BHC	73.0	36 - 137	
Heptachlor	ND	39.2	13.7		IS 13C10-Heptachlor	11.5	5 - 120	
Aldrin	ND	39.2	8.55		IS 13C12-Aldrin	57.7	5 - 120	
Oxychlordane	ND	39.2	15.1		IS 13C10-Oxychlordane	68.6	23 - 135	
cis-Heptachlor Epoxide	73.4	39.2	9.41		IS 13C10-cis-Heptachlor Epoxide	57.1	27 - 137	
trans-Heptachlor Epoxide	ND	39.2	31.7		IS 13C10-trans-Chlordane (gamma)	59.9	21 - 132	
trans-Chlordane (gamma)	191	39.2	15.7		IS 13C10-trans-Nonachlor	69.8	14 - 136	
trans-Nonachlor	105	39.2	14.7		IS 13C9-Endosulfan I (alpha)	51.4	15 - 148	
cis-Chlordane (alpha)	226	39.2	22.3		IS 13C12-2,4'-DDE	69.1	47 - 160	
Endosulfan I (alpha)	ND	196	76.4		IS 13C12-4,4'-DDE	70.9	47 - 160	
2,4'-DDE	114	39.2	24.7		IS 13C12-Dieldrin	51.5	40 - 151	
4,4'-DDE	1320	39.2	8.44		IS 13C12-Endrin	46.8	35 - 155	
Dieldrin	835	39.2	10.3		IS 13C10-cis-Nonachlor	62.4	36 - 139	
Endrin	279	39.2	19.2		IS 13C9-Endosulfan II (beta)	45.6	5 - 122	
cis-Nonachlor	ND	39.2	9.10		IS 13C12-2,4'-DDD	65.7	5 - 199	
Endosulfan II (beta)	ND	196	69.3		IS 13C12-2,4'-DDT	54.2	5 - 199	
2,4'-DDD	715	39.2	9.45		IS 13C12-4,4'-DDD	57.7	5 - 120	
2,4'-DDT	990	39.2	16.9		IS 13C12-4,4'-DDT	50.0	5 - 120	
4,4'-DDD	1130	39.2	13.5		IS 13C9-Endosulfan Sulfate	41.4	15 - 148	
4,4'-DDT	2140	39.2	16.9		IS 13C12-Methoxychlor	25.0	5 - 120	
Endosulfan Sulfate	ND	196	69.5		IS 13C10-Mirex	48.1	5 - 120	
4,4'-Methoxychlor	ND	39.2	66.6		IS 13C12-Endrin Aldehyde	14.4	15 - 148	H
Mirex	ND	39.2	6.51		IS 13C12-Endrin Ketone	28.3	15 - 148	
Endrin Aldehyde	ND	196	69.5					
Endrin Ketone	ND	196	46.7					

MDL - Method detection limit

LCL-UCL - Lower control limit - upper control limit

RL - Reporting limit

DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
CRS	Cleanup Recovery Standard
D	Dilution
DL	Detection limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
IS	Internal Standard
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limit of Detection
LOQ	Limit of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
NA	Not applicable
ND	Not Detected
OPR	Ongoing Precision and Recovery sample
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
RL	Reporting Limit
TEQ	Toxic Equivalency
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	19-013-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777-23
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Massachusetts Department of Environmental Protection	N/A
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1521520
New Hampshire Environmental Accreditation Program	207718-B
New Jersey Department of Environmental Protection	190001
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-010
Pennsylvania Department of Environmental Protection	016
Texas Commission on Environmental Quality	T104704189-19-10
Vermont Department of Health	VT-4042
Virginia Department of General Services	10272
Washington Department of Ecology	C584-19
Wisconsin Department of Natural Resources	998036160

Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.

NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	Method
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	Method
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613/1613B
1,4-Dioxane (1,4-Diethyleneoxide) analysis by GC/HRMS	EPA 522
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	Method
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A



2000096 0.3°C

Page 13 of 16

Sample Log-In Checklist

 Page # 1 of 1

 Vista Work Order #: 2000096

 TAT Std

Samples Arrival:	Date/Time <u>01/17/2020 08:40</u>		Initials: <u>HOG</u>		Location: <u>WR-2</u>		
	Shelf/Rack: <u>NA</u>						
Delivered By:	<input checked="" type="checkbox"/> FedEx	<input type="checkbox"/> UPS	<input type="checkbox"/> On Trac	<input type="checkbox"/> GSO	<input type="checkbox"/> DHL	<input type="checkbox"/> Hand Delivered	<input type="checkbox"/> Other
Preservation:	<input checked="" type="checkbox"/> Ice		<input type="checkbox"/> Blue Ice		<input type="checkbox"/> Dry Ice		<input type="checkbox"/> None
Temp °C: <u>0.3</u> (uncorrected)	Probe used: Y / <input checked="" type="checkbox"/> N			Thermometer ID: <u>IR-1</u>			
Temp °C: <u>0.3</u> (corrected)							

	YES	NO	NA		
Shipping Container(s) Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Shipping Custody Seals Intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Airbill <u>—</u> Trk # <u>7797 2727 8090</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Shipping Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Shipping Container	<input type="checkbox"/> Vista	<input checked="" type="checkbox"/> Client	<input type="checkbox"/> Retain	<input type="checkbox"/> Return	<input type="checkbox"/> Dispose
Chain of Custody / Sample Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chain of Custody / Sample Documentation Complete?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Holding Time Acceptable?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Logged In:	Date/Time <u>01/17/20 0920</u>	Initials: <u>KS</u>	Location: <u>WR-2</u>
	Shelf/Rack: <u>B-0</u>		
COC Anomaly/Sample Acceptance Form completed?			<input checked="" type="checkbox"/>

Comments:

CoC/Label Reconciliation Report WO# 2000096

LabNumber	CoC Sample ID	SampleAlias	Sample Date/Time	Container	BaseMatrix	Sample Comments
2000096-01	A TS2-E-200116	* <input type="checkbox"/>	16-Jan-20 10:20 <input checked="" type="checkbox"/>	Amber Glass NM Bottle, 1L	Aqueous	
2000096-01	B TS2-E-200116	* <input type="checkbox"/>	16-Jan-20 10:20 <input checked="" type="checkbox"/>	Amber Glass NM Bottle, 1L	Aqueous	
2000096-01	C TS2-E-200116	* <input type="checkbox"/>	16-Jan-20 10:20 <input checked="" type="checkbox"/>	Amber Glass NM Bottle, 1L	Aqueous	

Checkmarks indicate that information on the COC reconciled with the sample label.
Any discrepancies are noted in the following columns.

	Yes	No	NA
Sample Container Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample Custody Seals Intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Adequate Sample Volume?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Container Type Appropriate for Analysis(es)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Preservation Documented: Na2S2O3 Trizma <u>None</u> Other	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
If Chlorinated or Drinking Water Samples, Acceptable Preservation?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Comments: * CoC sample ID and label sample ID do not match. Reconciled by date and time.
Ex:

COC	label
TS2-E-200116	TS2 SH 01/17/20 TS-E-200116

Verified by/Date: SH 01/17/20



ANOMALY FORM

Vista Work Order 2000096

Initial/Date The following checked issues were noted during sample receipt and login:

- 5/1/17/20 ☒ 1. The samples were received out of temperature at (WI-PHT): _____
Was Ice present: Yes No Melted Blue Ice
- _____ ☐ 2. The Chain-of-Custody (CoC) was not relinquished properly.
- _____ ☐ 3. The CoC did not include collection time(s). 00:00 will be used unless notified otherwise.
- _____ ☐ 4. The sample(s) did not include a sample collection time. All or Sample Name: _____
- 5/1/17/20 ☒ 5. A sample ID discrepancy was found. See the Reconciliation report.
The CoC Sample ID will be used unless notified otherwise.
- _____ ☐ 6. A sample date and/or time discrepancy was found. See the Reconciliation report.
The CoC Sample date/time will be used unless notified otherwise.
- _____ ☐ 7. The CoC did not include a sample matrix. The following sample matrix will be used: _____
- _____ ☐ 8. Insufficient volume received for analysis. All or Sample Name: _____
- _____ ☐ 9. The backup bottle was received broken. Sample Name: _____
- _____ ☐ 10. CoC not received, illegible or destroyed.
- _____ ☐ 11. The sample(s) were received out of holding time. All or Sample Name: _____
- _____ ☐ 12. The CoC did not include an analysis. All or Sample Name: _____
- _____ ☐ 13. Sample(s) received without collection date. All or Sample Name: _____
- _____ ☐ 14. Sample(s) not received. All or Sample Name: _____
- _____ ☐ 15. Sample(s) received broken. All or Sample Name: _____
- _____ ☐ 16. An incorrect container-type was used. All or Sample Name: _____
- _____ ☐ 17. Other: _____

Bolded items require sign-off

Client Contacted: _____

Date of Contact: _____

Vista Client Manager: _____

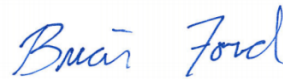
Resolution: _____

CDIM Engineering - San Francisco, CA

Sample Delivery Group: L1168712
Samples Received: 12/09/2019
Project Number: 101-004
Description: LRTC Industrial Stormwater

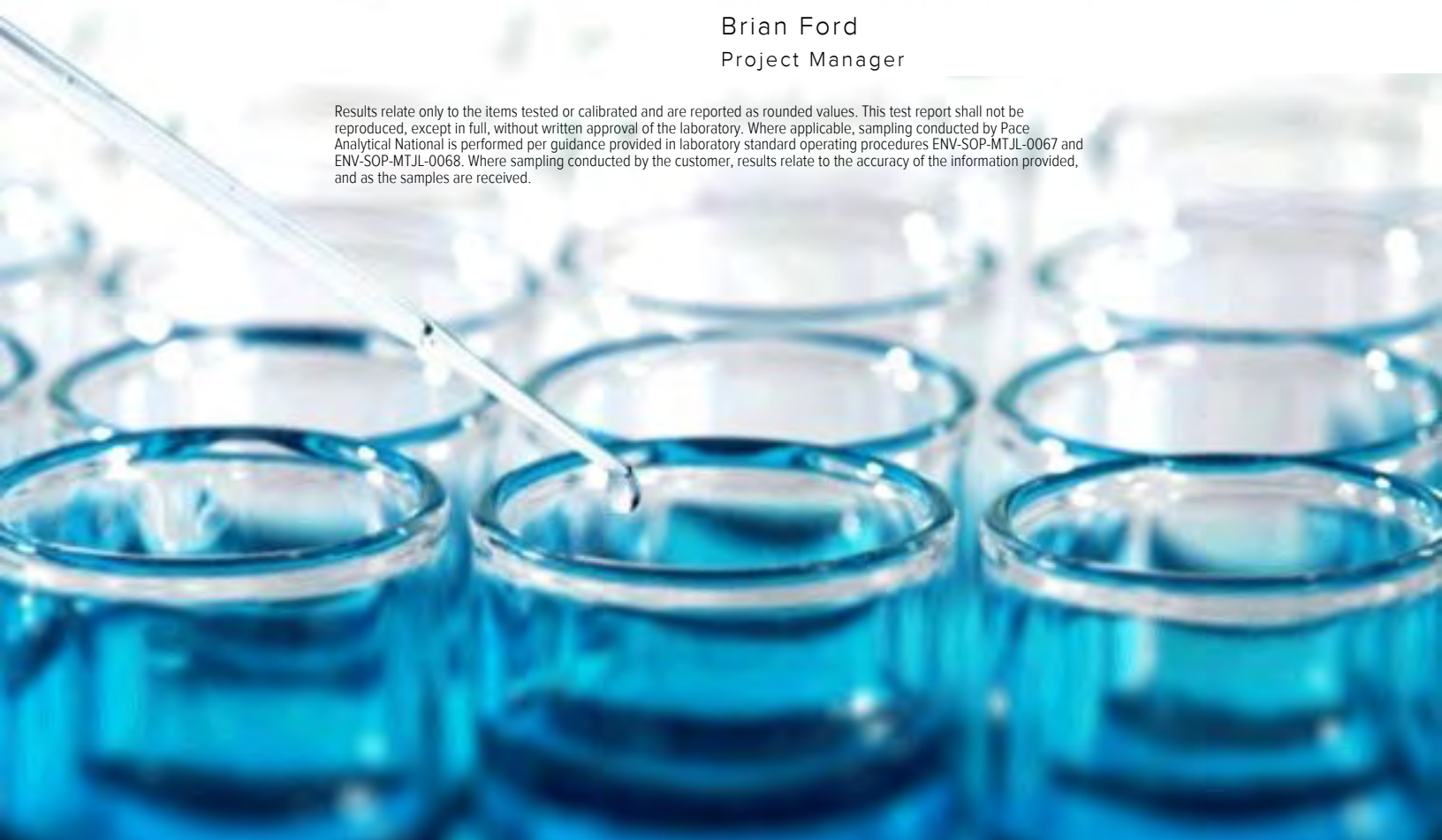
Report To: Bryan Starks
45 Polk Street
3rd Floor
San Francisco, CA 94102

Entire Report Reviewed By:



Brian Ford
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.





Cp: Cover Page	1
Tc: Table of Contents	2
Ss: Sample Summary	3
Cn: Case Narrative	4
Sr: Sample Results	5
TS2-I-191207 L1168712-01	5
TS3-I-191207 L1168712-02	6
TS4-I-191207 L1168712-03	7
TS1-I-191207 L1168712-04	8
Qc: Quality Control Summary	9
Gravimetric Analysis by Method 2540 D-2011	9
Wet Chemistry by Method 1664A	11
Wet Chemistry by Method 4500H+ B-2011	12
Metals (ICPMS) by Method 200.8	23
Gl: Glossary of Terms	26
Al: Accreditations & Locations	27
Sc: Sample Chain of Custody	28



SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



TS2-I-191207 L1168712-01 WW

Collected by
BS

Collected date/time
12/07/19 08:35

Received date/time
12/09/19 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 D-2011	WG1394715	1	12/11/19 13:30	12/11/19 17:08	MMF	Mt. Juliet, TN
Wet Chemistry by Method 1664A	WG1395550	1	12/12/19 07:01	12/12/19 21:17	MBP	Mt. Juliet, TN
Wet Chemistry by Method 4500H+ B-2011	WG1393571	1	12/09/19 20:00	12/09/19 20:00	JIC	Mt. Juliet, TN
Metals (ICPMS) by Method 200.8	WG1394172	1	12/11/19 07:25	12/11/19 15:04	JPD	Mt. Juliet, TN

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

TS3-I-191207 L1168712-02 WW

Collected by
BS

Collected date/time
12/07/19 09:13

Received date/time
12/09/19 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 D-2011	WG1394715	1	12/11/19 13:30	12/11/19 17:08	MMF	Mt. Juliet, TN
Wet Chemistry by Method 1664A	WG1395550	1	12/12/19 07:01	12/12/19 21:17	MBP	Mt. Juliet, TN
Wet Chemistry by Method 4500H+ B-2011	WG1393571	1	12/09/19 20:00	12/09/19 20:00	JIC	Mt. Juliet, TN
Metals (ICPMS) by Method 200.8	WG1394172	1	12/11/19 07:25	12/11/19 15:07	JPD	Mt. Juliet, TN

TS4-I-191207 L1168712-03 WW

Collected by
BS

Collected date/time
12/07/19 09:40

Received date/time
12/09/19 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 D-2011	WG1394715	1	12/11/19 13:30	12/11/19 17:08	MMF	Mt. Juliet, TN
Wet Chemistry by Method 1664A	WG1395550	1	12/12/19 07:01	12/12/19 21:17	MBP	Mt. Juliet, TN
Wet Chemistry by Method 4500H+ B-2011	WG1393571	1	12/09/19 20:00	12/09/19 20:00	JIC	Mt. Juliet, TN
Metals (ICPMS) by Method 200.8	WG1394172	1	12/11/19 07:25	12/11/19 15:10	JPD	Mt. Juliet, TN

TS1-I-191207 L1168712-04 WW

Collected by
BS

Collected date/time
12/07/19 08:12

Received date/time
12/09/19 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 D-2011	WG1395315	1	12/12/19 10:13	12/12/19 12:22	MMF	Mt. Juliet, TN
Wet Chemistry by Method 1664A	WG1395550	1	12/12/19 07:01	12/12/19 21:17	MBP	Mt. Juliet, TN
Wet Chemistry by Method 4500H+ B-2011	WG1394701	1	12/11/19 20:50	12/11/19 20:50	MSP	Mt. Juliet, TN
Metals (ICPMS) by Method 200.8	WG1394538	1	12/11/19 16:14	12/12/19 15:32	JPD	Mt. Juliet, TN
Metals (ICPMS) by Method 200.8	WG1395905	1	12/13/19 13:40	12/14/19 12:02	JPD	Mt. Juliet, TN

ACCOUNT:

CDIM Engineering - San Francisco, CA

PROJECT:

101-004

SDG:

L1168712

DATE/TIME:

12/16/19 14:41

PAGE:

3 of 28



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Brian Ford
Project Manager

¹ Cp² Tc³ Ss⁴ Cn⁵ Sr⁶ Qc⁷ Gl⁸ Al⁹ Sc



Gravimetric Analysis by Method 2540 D-2011

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Suspended Solids	16000	<u>J P1</u>	3500	25000	1	12/11/2019 17:08	WG1394715

1 Cp

2 Tc

3 Ss

4 Cn

Wet Chemistry by Method 1664A

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
TPH - Oil & Grease	U		763	5260	1	12/12/2019 21:17	WG1395550

5 Sr

6 Qc

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	7.64	<u>T8</u>	1	12/09/2019 20:00	WG1393571

7 Gl

8 Al

Sample Narrative:

L1168712-01 WG1393571: 7.64 at 17.1C

9 Sc

Metals (ICPMS) by Method 200.8

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Aluminum	208		20.0	100	1	12/11/2019 15:04	WG1394172
Iron	361		15.0	100	1	12/11/2019 15:04	WG1394172
Lead	9.24		0.260	1.00	1	12/11/2019 15:04	WG1394172
Zinc	95.3		1.91	10.0	1	12/11/2019 15:04	WG1394172



Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	2400	J	700	5000	1	12/11/2019 17:08	WG1394715

Sample Narrative:

L1168712-02 WG1394715: Reporting limit determined by filtrate volume.

Wet Chemistry by Method 1664A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
TPH - Oil & Grease	U		806	5560	1	12/12/2019 21:17	WG1395550

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.40	T8	1	12/09/2019 20:00	WG1393571

Sample Narrative:

L1168712-02 WG1393571: 7.4 at 17.5C

Metals (ICPMS) by Method 200.8

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Aluminum	72.8	J	20.0	100	1	12/11/2019 15:07	WG1394172
Iron	156		15.0	100	1	12/11/2019 15:07	WG1394172
Lead	8.08		0.260	1.00	1	12/11/2019 15:07	WG1394172
Zinc	69.3		1.91	10.0	1	12/11/2019 15:07	WG1394172

¹ Cp² Tc³ Ss⁴ Cn⁵ Sr⁶ Qc⁷ Gl⁸ Al⁹ Sc



Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	44000		3500	25000	1	12/11/2019 17:08	WG1394715

1 Cp

2 Tc

3 Ss

4 Cn

Wet Chemistry by Method 1664A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
TPH - Oil & Grease	U		797	5490	1	12/12/2019 21:17	WG1395550

5 Sr

6 Qc

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.50	T8	1	12/09/2019 20:00	WG1393571

7 Gl

8 Al

Sample Narrative:

L1168712-03 WG1393571: 7.5 at 17.6C

Metals (ICPMS) by Method 200.8

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Aluminum	281		20.0	100	1	12/11/2019 15:10	WG1394172
Iron	619		15.0	100	1	12/11/2019 15:10	WG1394172
Lead	15.5		0.260	1.00	1	12/11/2019 15:10	WG1394172
Zinc	106		1.91	10.0	1	12/11/2019 15:10	WG1394172

9 Sc



Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	248000		14000	100000	1	12/12/2019 12:22	WG1395315

1 Cp

2 Tc

3 Ss

4 Cn

Wet Chemistry by Method 1664A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
TPH - Oil & Grease	U		755	5210	1	12/12/2019 21:17	WG1395550

5 Sr

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.49	T8	1	12/11/2019 20:50	WG1394701

6 Qc

7 Gl

Sample Narrative:

L1168712-04 WG1394701: 8.49 at 15.2C

8 Al

Metals (ICPMS) by Method 200.8

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Aluminum	1980		20.0	100	1	12/12/2019 15:32	WG1394538
Iron	8710		15.0	100	1	12/12/2019 15:32	WG1394538
Lead	438		0.260	1.00	1	12/12/2019 15:32	WG1394538
Zinc	2100		1.91	10.0	1	12/14/2019 12:02	WG1395905

9 Sc

Method Blank (MB)

(MB) R3481652-1 12/11/19 17:08

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	ug/l		ug/l	ug/l
Suspended Solids	U		350	2500

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L1168712-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1168712-01 12/11/19 17:08 • (DUP) R3481652-3 12/11/19 17:08

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	ug/l	ug/l		%		%
Suspended Solids	16000	19000	1	17.1	J P1	5

L1168739-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1168739-01 12/11/19 17:08 • (DUP) R3481652-4 12/11/19 17:08

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	ug/l	ug/l		%		%
Suspended Solids	280000	296000	1	5.56	P1	5

Laboratory Control Sample (LCS)

(LCS) R3481652-2 12/11/19 17:08

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	ug/l	ug/l	%	%	
Suspended Solids	773000	868000	112	85.0-115	

Method Blank (MB)

(MB) R3482510-1 12/12/19 12:22

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	ug/l		ug/l	ug/l
Suspended Solids	U		350	2500

¹ Cp

² Tc

³ Ss

L1169169-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1169169-03 12/12/19 12:22 • (DUP) R3482510-4 12/12/19 12:22

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	ug/l	ug/l		%		%
Suspended Solids	192000	176000	1	8.70	J3	5

⁴ Cn

⁵ Sr

⁶ Qc

Laboratory Control Sample (LCS)

(LCS) R3482510-2 12/12/19 12:22

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	ug/l	ug/l	%	%	
Suspended Solids	773000	796000	103	85.0-115	

⁷ Gl

⁸ Al

⁹ Sc



Method Blank (MB)

(MB) R3481949-1 12/12/19 21:17

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
TPH - Oil & Grease	U		725	5000

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3481949-2 12/12/19 21:17 • (LCSD) R3481949-3 12/12/19 21:17

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
TPH - Oil & Grease	20000	17800	21000	89.0	105	64.0-132			16.5	34

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc



L1167901-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1167901-01 12/09/19 20:00 • (DUP) R3480683-2 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.38	7.37	1	0.136		1

Sample Narrative:

OS: 7.38 at 16.2C

DUP: 7.37 at 16.2C



L1168110-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1168110-01 12/09/19 20:00 • (DUP) R3480683-3 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.38	7.40	1	0.271		1

Sample Narrative:

OS: 7.38 at 15.2C

DUP: 7.4 at 15.2C

L1168110-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1168110-02 12/09/19 20:00 • (DUP) R3480683-4 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.40	7.41	1	0.135		1

Sample Narrative:

OS: 7.4 at 14.6C

DUP: 7.41 at 13.9C

L1168110-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1168110-03 12/09/19 20:00 • (DUP) R3480683-5 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.22	7.23	1	0.138		1

Sample Narrative:



L1168110-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1168110-03 12/09/19 20:00 • (DUP) R3480683-5 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
OS: 7.22 at 14.8C						
DUP: 7.23 at 14.2C						

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L1168110-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1168110-04 12/09/19 20:00 • (DUP) R3480683-6 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.25	7.26	1	0.138		1

Sample Narrative:

OS: 7.25 at 16.6C

DUP: 7.26 at 16.3C

L1168110-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1168110-05 12/09/19 20:00 • (DUP) R3480683-7 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.23	7.28	1	0.689		1

Sample Narrative:

OS: 7.23 at 14.8C

DUP: 7.28 at 13.5C

L1168110-06 Original Sample (OS) • Duplicate (DUP)

(OS) L1168110-06 12/09/19 20:00 • (DUP) R3480683-8 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.20	7.20	1	0.000		1

Sample Narrative:

OS: 7.2 at 14.2C

DUP: 7.2 at 14.2C



L1168110-07 Original Sample (OS) • Duplicate (DUP)

(OS) L1168110-07 12/09/19 20:00 • (DUP) R3480683-9 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.27	7.32	1	0.685		1

Sample Narrative:

OS: 7.27 at 160C

DUP: 7.32 at 16.2C



L1168110-08 Original Sample (OS) • Duplicate (DUP)

(OS) L1168110-08 12/09/19 20:00 • (DUP) R3480683-10 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.33	7.34	1	0.136		1

Sample Narrative:

OS: 7.33 at 16.4C

DUP: 7.34 at 16.3C

L1168110-09 Original Sample (OS) • Duplicate (DUP)

(OS) L1168110-09 12/09/19 20:00 • (DUP) R3480683-11 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.24	7.25	1	0.138		1

Sample Narrative:

OS: 7.24 at 17.1C

DUP: 7.25 at 16.8C

L1168110-10 Original Sample (OS) • Duplicate (DUP)

(OS) L1168110-10 12/09/19 20:00 • (DUP) R3480683-12 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.20	7.20	1	0.000		1

Sample Narrative:

L1168110-10 Original Sample (OS) • Duplicate (DUP)

(OS) L1168110-10 12/09/19 20:00 • (DUP) R3480683-12 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
OS: 7.2 at 17.9C						
DUP: 7.2 at 17.6C						

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L1168110-11 Original Sample (OS) • Duplicate (DUP)

(OS) L1168110-11 12/09/19 20:00 • (DUP) R3480683-13 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.26	7.29	1	0.412		1

Sample Narrative:

OS: 7.26 at 17.7C
DUP: 7.29 at 17.8C

L1168157-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1168157-02 12/09/19 20:00 • (DUP) R3480683-14 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.30	7.34	1	0.546		1

Sample Narrative:

OS: 7.3 at 18.9C
DUP: 7.34 at 20C

L1168287-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1168287-02 12/09/19 20:00 • (DUP) R3480683-15 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	6.88	6.90	1	0.290		1

Sample Narrative:

OS: 6.88 at 19.3C
DUP: 6.9 at 14.6C



L1168322-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1168322-01 12/09/19 20:00 • (DUP) R3480683-16 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.24	7.27	1	0.414		1

Sample Narrative:

OS: 7.24 at 18.9C

DUP: 7.27 at 19.6C



L1168711-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1168711-01 12/09/19 20:00 • (DUP) R3480683-17 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.11	7.06	1	0.706		1

Sample Narrative:

OS: 7.11 at 17.1C

DUP: 7.06 at 17.1C

L1168711-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1168711-03 12/09/19 20:00 • (DUP) R3480683-18 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.56	7.57	1	0.132		1

Sample Narrative:

OS: 7.56 at 16.6C

DUP: 7.57 at 16.8C

L1168712-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1168712-01 12/09/19 20:00 • (DUP) R3480683-19 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.64	7.68	1	0.522		1

Sample Narrative:



L1168712-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1168712-01 12/09/19 20:00 • (DUP) R3480683-19 12/09/19 20:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
OS: 7.64 at 17.1C						
DUP: 7.68 at 16.8C						

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L1168712-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1168712-02 12/09/19 20:00 • (DUP) R3480683-20 12/09/19 20:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	7.40	7.41	1	0.135		1

Sample Narrative:

OS: 7.4 at 17.5C

DUP: 7.41 at 17.2C

L1168712-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1168712-03 12/09/19 20:00 • (DUP) R3480683-21 12/09/19 20:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	7.50	7.52	1	0.266		1

Sample Narrative:

OS: 7.5 at 17.6C

DUP: 7.52 at 17.5C

Laboratory Control Sample (LCS)

(LCS) R3480683-1 12/09/19 20:00

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	su	su	%	%	
pH	10.0	10.0	100	99.0-101	

Sample Narrative:

LCS: 10.01 at 19.8C



L1168381-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1168381-01 12/11/19 20:50 • (DUP) R3481494-5 12/11/19 20:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.86	7.86	1	0.000		1

Sample Narrative:

OS: 7.86 at 15C

DUP: 7.86 at 15.1C



L1168711-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1168711-04 12/11/19 20:50 • (DUP) R3481494-6 12/11/19 20:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.67	7.67	1	0.000		1

Sample Narrative:

OS: 7.67 at 15.4C

DUP: 7.67 at 15.8C

L1168711-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1168711-05 12/11/19 20:50 • (DUP) R3481494-7 12/11/19 20:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.56	7.58	1	0.264		1

Sample Narrative:

OS: 7.56 at 15.4C

DUP: 7.58 at 15.8C

L1168712-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1168712-04 12/11/19 20:50 • (DUP) R3481494-8 12/11/19 20:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	8.49	8.50	1	0.118		1

Sample Narrative:

L1168712-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1168712-04 12/11/19 20:50 • (DUP) R3481494-8 12/11/19 20:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
OS: 8.49 at 15.2C						
DUP: 8.5 at 15.3C						

L1168740-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1168740-01 12/11/19 20:50 • (DUP) R3481494-9 12/11/19 20:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.39	7.39	1	0.000		1

Sample Narrative:

OS: 7.39 at 17.7C
DUP: 7.39 at 17.6C

L1168785-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1168785-01 12/11/19 20:50 • (DUP) R3481494-10 12/11/19 20:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.53	7.54	1	0.133		1

Sample Narrative:

OS: 7.53 at 14.5C
DUP: 7.54 at 14.5C

L1168786-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1168786-01 12/11/19 20:50 • (DUP) R3481494-11 12/11/19 20:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	6.22	6.21	1	0.161		1

Sample Narrative:

OS: 6.22 at 15.6C
DUP: 6.21 at 15.5C

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



L1168787-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1168787-01 12/11/19 20:50 • (DUP) R3481494-12 12/11/19 20:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	6.10	6.11	1	0.164		1

Sample Narrative:

OS: 6.1 at 15C

DUP: 6.11 at 15.1C



L1168792-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1168792-01 12/11/19 20:50 • (DUP) R3481494-13 12/11/19 20:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	8.56	8.56	1	0.000		1

Sample Narrative:

OS: 8.56 at 17.6C

DUP: 8.56 at 17.6C

L1168800-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1168800-01 12/11/19 20:50 • (DUP) R3481494-14 12/11/19 20:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	8.58	8.57	1	0.117		1

Sample Narrative:

OS: 8.58 at 15.4C

DUP: 8.57 at 15.3C

L1169147-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1169147-01 12/11/19 20:50 • (DUP) R3481494-15 12/11/19 20:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	8.29	8.30	1	0.121		1

Sample Narrative:



L1169147-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1169147-01 12/11/19 20:50 • (DUP) R3481494-15 12/11/19 20:50

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
OS: 8.29 at 17.9C						
DUP: 8.3 at 17.8C						

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L1169161-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1169161-02 12/11/19 20:50 • (DUP) R3481494-16 12/11/19 20:50

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	8.96	8.97	1	0.112		1

Sample Narrative:

OS: 8.96 at 15.6C
DUP: 8.97 at 15.5C

L1169197-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1169197-01 12/11/19 20:50 • (DUP) R3481494-17 12/11/19 20:50

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	8.00	8.00	1	0.000		1

Sample Narrative:

OS: 8 at 16.1C
DUP: 8 at 16.2C

L1169198-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1169198-02 12/11/19 20:50 • (DUP) R3481494-18 12/11/19 20:50

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	7.97	7.96	1	0.126		1

Sample Narrative:

OS: 7.97 at 16C
DUP: 7.96 at 16.7C

L1169201-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1169201-02 12/11/19 20:50 • (DUP) R3481494-19 12/11/19 20:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	6.53	6.53	1	0.000		1

Sample Narrative:

OS: 6.53 at 15.9C
DUP: 6.53 at 16C

L1169306-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1169306-01 12/11/19 20:50 • (DUP) R3481494-20 12/11/19 20:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	6.64	6.67	1	0.451		1

Sample Narrative:

OS: 6.64 at 17.3C
DUP: 6.67 at 17.4C

L1169306-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1169306-02 12/11/19 20:50 • (DUP) R3481494-21 12/11/19 20:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	8.76	8.68	1	0.917		1

Sample Narrative:

OS: 8.76 at 17.2C
DUP: 8.68 at 17.1C

Laboratory Control Sample (LCS)

(LCS) R3481494-1 12/11/19 20:50

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	su	su	%	%	
pH	10.0	10.0	100	99.0-101	

Sample Narrative:

LCS: 10.01 at 18C

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc

Method Blank (MB)

(MB) R3481402-1 12/11/19 14:07

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Aluminum	U		20.0	100
Iron	U		15.0	100
Lead	U		0.260	1.00
Zinc	U		1.91	10.0

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3481402-2 12/11/19 14:11 • (LCSD) R3481402-3 12/11/19 14:14

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Aluminum	5000	4820	4910	96.5	98.2	85.0-115			1.78	20
Iron	5000	4850	4940	96.9	98.8	85.0-115			1.94	20
Lead	50.0	48.5	50.6	97.0	101	85.0-115			4.18	20
Zinc	50.0	49.7	51.5	99.3	103	85.0-115			3.59	20

L1168711-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1168711-03 12/11/19 14:17 • (MS) R3481402-5 12/11/19 14:24 • (MSD) R3481402-6 12/11/19 14:27

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum	5000	U	4810	5070	96.1	101	1	70.0-130			5.34	20
Iron	5000	34.9	4830	5000	95.9	99.4	1	70.0-130			3.56	20
Lead	50.0	0.562	50.6	51.6	100	102	1	70.0-130			1.95	20
Zinc	50.0	55.0	101	104	93.0	98.6	1	70.0-130			2.71	20

L1168815-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1168815-01 12/11/19 14:31 • (MS) R3481402-7 12/11/19 14:34 • (MSD) R3481402-8 12/11/19 14:37

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum	5000	360	5300	5310	98.8	98.9	1	70.0-130			0.146	20
Iron	5000	ND	5300	5140	104	101	1	70.0-130			2.98	20
Lead	50.0	ND	53.2	50.0	106	99.3	1	70.0-130			6.29	20
Zinc	50.0	45.6	92.0	96.9	92.8	103	1	70.0-130			5.20	20

Method Blank (MB)

(MB) R3481875-1 12/12/19 14:50

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	ug/l		ug/l	ug/l
Aluminum	U		20.0	100
Iron	U		15.0	100
Lead	0.354	J	0.260	1.00

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3481875-2 12/12/19 14:53 • (LCSD) R3481875-3 12/12/19 14:57

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	ug/l	ug/l	ug/l	%	%	%			%	%
Aluminum	5000	5500	5400	110	108	85.0-115			1.80	20
Iron	5000	5460	5410	109	108	85.0-115			0.850	20
Lead	50.0	53.8	55.5	108	111	85.0-115			2.99	20

L1168711-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1168711-04 12/12/19 15:00 • (MS) R3481875-5 12/12/19 15:06 • (MSD) R3481875-6 12/12/19 15:10

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	ug/l	ug/l	ug/l	ug/l	%	%		%			%	%
Aluminum	5000	164	5450	5720	106	111	1	70.0-130			4.86	20
Iron	5000	327	5830	5760	110	109	1	70.0-130			1.18	20
Lead	50.0	15.9	68.8	70.0	106	108	1	70.0-130			1.73	20

L1169410-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1169410-01 12/12/19 15:13 • (MS) R3481875-7 12/12/19 15:16 • (MSD) R3481875-8 12/12/19 15:19

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	ug/l	ug/l	ug/l	ug/l	%	%		%			%	%
Aluminum	5000	144	5170	5220	100	101	1	70.0-130			0.888	20
Iron	5000	27.5	5230	5160	104	103	1	70.0-130			1.41	20
Lead	50.0	0.459	50.9	51.5	101	102	1	70.0-130			1.26	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R3482357-1 12/14/19 11:32

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Zinc	U		1.91	10.0

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3482357-2 12/14/19 11:35 • (LCSD) R3482357-3 12/14/19 11:38

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Zinc	50.0	48.5	49.2	96.9	98.5	85.0-115			1.60	20

L1169450-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1169450-02 12/14/19 11:42 • (MS) R3482357-5 12/14/19 11:48 • (MSD) R3482357-6 12/14/19 11:52

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Zinc	50.0	17.5	62.1	63.0	89.1	90.9	1	70.0-130			1.48	20



Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier Description

J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
T8	Sample(s) received past/too close to holding time expiration.

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 G

8 Al

9 Sc



Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico ¹	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1 6}	90010	South Carolina	84004
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1 4}	2006
Louisiana ¹	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

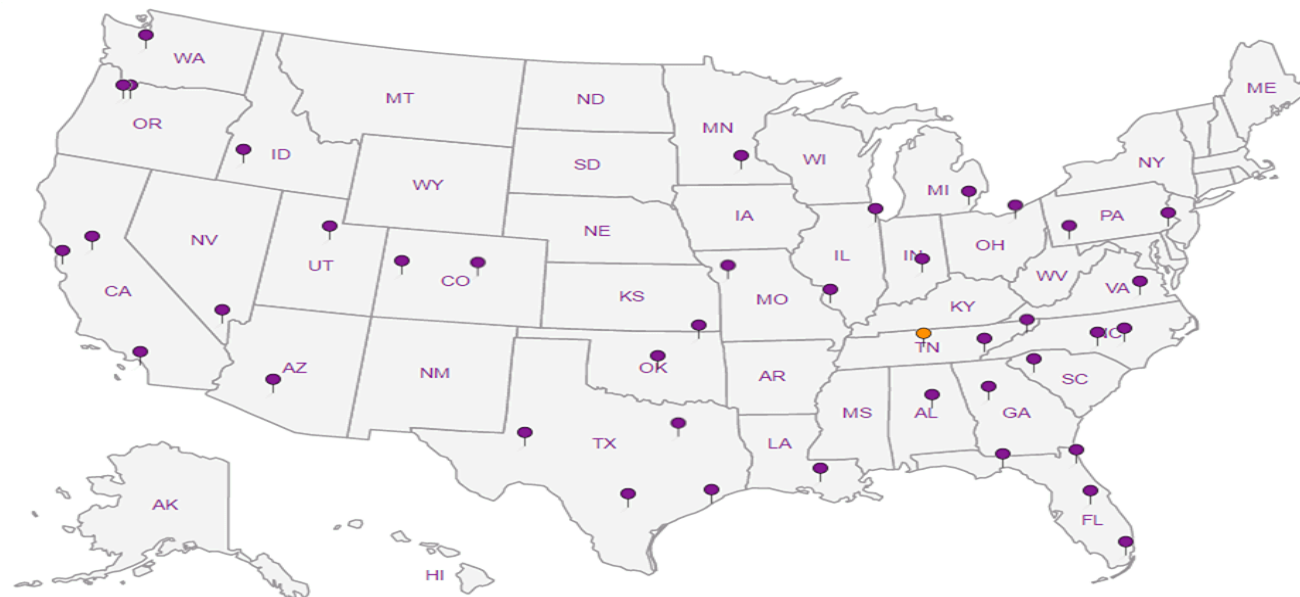
Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP, LLC EMLAP	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ⁶ Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.

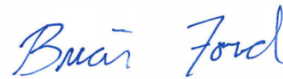


CDIM Engineering - San Francisco, CA

Sample Delivery Group: L1168711
Samples Received: 12/09/2019
Project Number: 101-004
Description: LRTC Industrial Stormwater

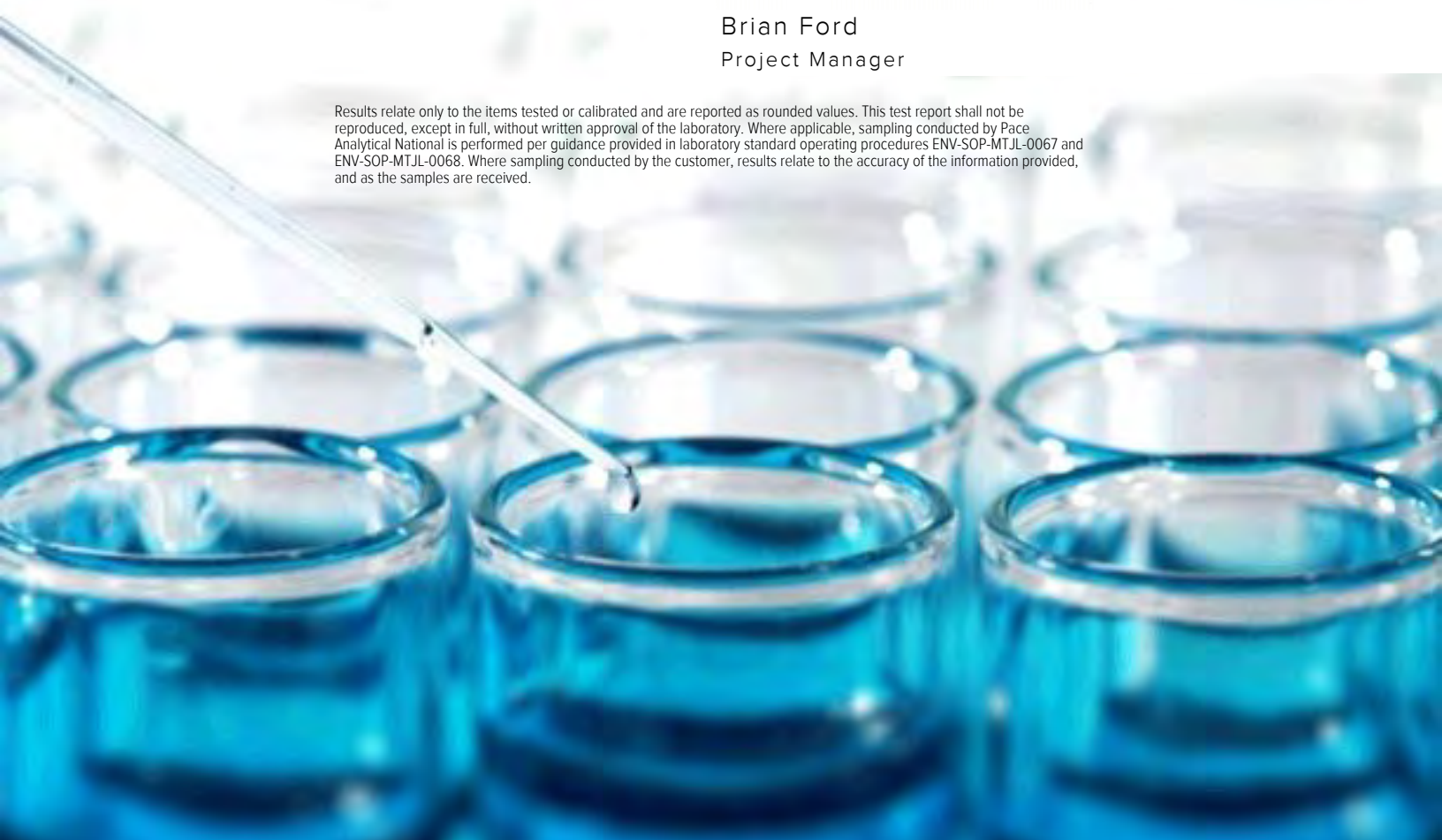
Report To: Bryan Starks
45 Polk Street
3rd Floor
San Francisco, CA 94102

Entire Report Reviewed By:



Brian Ford
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.





Cp: Cover Page	1	¹ Cp
Tc: Table of Contents	2	
Ss: Sample Summary	3	² Tc
Cn: Case Narrative	4	
Sr: Sample Results	5	³ Ss
TS3-E-191207 L1168711-01	5	
TS4-E-191207 L1168711-02	6	⁴ Cn
TSX-E-191207 L1168711-03	7	⁵ Sr
TS1-E-191207 L1168711-04	8	
TS2-E-191207 L1168711-05	9	⁶ Qc
Qc: Quality Control Summary	10	⁷ Gl
Gravimetric Analysis by Method 2540 D-2011	10	
Wet Chemistry by Method 1664A	12	⁸ Al
Wet Chemistry by Method 4500H+ B-2011	13	
Metals (ICPMS) by Method 200.8	30	⁹ Sc
Gl: Glossary of Terms	33	
Al: Accreditations & Locations	34	
Sc: Sample Chain of Custody	35	

SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



TS3-E-191207 L1168711-01 WW

Collected by
BS

Collected date/time
12/07/19 09:20

Received date/time
12/09/19 10:25

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 D-2011	WG1394715	1	12/11/19 13:30	12/11/19 17:08	MMF	Mt. Juliet, TN
Wet Chemistry by Method 1664A	WG1395550	1	12/12/19 07:01	12/12/19 21:17	MBP	Mt. Juliet, TN
Wet Chemistry by Method 4500H+ B-2011	WG1393571	1	12/09/19 20:00	12/09/19 20:00	JIC	Mt. Juliet, TN
Metals (ICPMS) by Method 200.8	WG1394172	1	12/11/19 07:25	12/11/19 14:57	JPD	Mt. Juliet, TN

¹ Cp

² Tc

³ Ss

⁴ Cn

TS4-E-191207 L1168711-02 WW

Collected by
BS

Collected date/time
12/07/19 09:47

Received date/time
12/09/19 10:25

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 D-2011	WG1394715	1	12/11/19 13:30	12/11/19 17:08	MMF	Mt. Juliet, TN
Wet Chemistry by Method 1664A	WG1395550	1	12/12/19 07:01	12/12/19 21:17	MBP	Mt. Juliet, TN
Wet Chemistry by Method 4500H+ B-2011	WG1393689	1	12/11/19 18:00	12/11/19 18:00	JIC	Mt. Juliet, TN
Metals (ICPMS) by Method 200.8	WG1394172	1	12/11/19 07:25	12/11/19 15:00	JPD	Mt. Juliet, TN

⁵ Sr

⁶ Qc

⁷ Gl

TSX-E-191207 L1168711-03 WW

Collected by
BS

Collected date/time
12/07/19 08:48

Received date/time
12/09/19 10:25

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 D-2011	WG1394715	1	12/11/19 13:30	12/11/19 17:08	MMF	Mt. Juliet, TN
Wet Chemistry by Method 1664A	WG1395550	1	12/12/19 07:01	12/12/19 21:17	MBP	Mt. Juliet, TN
Wet Chemistry by Method 4500H+ B-2011	WG1393571	1	12/09/19 20:00	12/09/19 20:00	JIC	Mt. Juliet, TN
Metals (ICPMS) by Method 200.8	WG1394172	1	12/11/19 07:25	12/11/19 14:17	JPD	Mt. Juliet, TN

⁸ Al

⁹ Sc

TS1-E-191207 L1168711-04 WW

Collected by
BS

Collected date/time
12/07/19 08:15

Received date/time
12/09/19 10:25

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 D-2011	WG1395315	1	12/12/19 10:13	12/12/19 12:22	MMF	Mt. Juliet, TN
Wet Chemistry by Method 1664A	WG1395550	1	12/12/19 07:01	12/12/19 21:17	MBP	Mt. Juliet, TN
Wet Chemistry by Method 4500H+ B-2011	WG1394701	1	12/11/19 20:50	12/11/19 20:50	MSP	Mt. Juliet, TN
Metals (ICPMS) by Method 200.8	WG1394538	1	12/11/19 16:14	12/12/19 15:00	JPD	Mt. Juliet, TN
Metals (ICPMS) by Method 200.8	WG1395905	1	12/13/19 13:40	12/14/19 11:55	JPD	Mt. Juliet, TN

TS2-E-191207 L1168711-05 WW

Collected by
BS

Collected date/time
12/07/19 08:45

Received date/time
12/09/19 10:25

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 D-2011	WG1395315	1	12/12/19 10:13	12/12/19 12:22	MMF	Mt. Juliet, TN
Wet Chemistry by Method 1664A	WG1395550	1	12/12/19 07:01	12/12/19 21:17	MBP	Mt. Juliet, TN
Wet Chemistry by Method 4500H+ B-2011	WG1394701	1	12/11/19 20:50	12/11/19 20:50	MSP	Mt. Juliet, TN
Metals (ICPMS) by Method 200.8	WG1394538	1	12/11/19 16:14	12/12/19 15:29	JPD	Mt. Juliet, TN
Metals (ICPMS) by Method 200.8	WG1395905	1	12/13/19 13:40	12/14/19 11:58	JPD	Mt. Juliet, TN

ACCOUNT:

CDIM Engineering - San Francisco, CA

PROJECT:

101-004

SDG:

L1168711

DATE/TIME:

12/16/19 14:48

PAGE:

3 of 35



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Brian Ford
Project Manager

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	U		350	2500	1	12/11/2019 17:08	WG1394715

1 Cp

2 Tc

3 Ss

4 Cn

Wet Chemistry by Method 1664A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
TPH - Oil & Grease	U		771	5320	1	12/12/2019 21:17	WG1395550

5 Sr

6 Qc

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.11	T8	1	12/09/2019 20:00	WG1393571

7 Gl

8 Al

Sample Narrative:

L1168711-01 WG1393571: 7.11 at 17.1C

Metals (ICPMS) by Method 200.8

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Aluminum	U		20.0	100	1	12/11/2019 14:57	WG1394172
Iron	79.6	J	15.0	100	1	12/11/2019 14:57	WG1394172
Lead	1.97		0.260	1.00	1	12/11/2019 14:57	WG1394172
Zinc	50.0		1.91	10.0	1	12/11/2019 14:57	WG1394172

9 Sc



Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	400	J	350	2500	1	12/11/2019 17:08	WG1394715

1 Cp

2 Tc

3 Ss

4 Cn

Wet Chemistry by Method 1664A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
TPH - Oil & Grease	U		788	5440	1	12/12/2019 21:17	WG1395550

5 Sr

6 Qc

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.59	T8	1	12/11/2019 18:00	WG1393689

7 Gl

8 Al

Sample Narrative:

L1168711-02 WG1393689: 7.59 at 18.1C

9 Sc

Metals (ICPMS) by Method 200.8

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Aluminum	32.1	J	20.0	100	1	12/11/2019 15:00	WG1394172
Iron	29.6	J	15.0	100	1	12/11/2019 15:00	WG1394172
Lead	0.546	J	0.260	1.00	1	12/11/2019 15:00	WG1394172
Zinc	7.57	J	1.91	10.0	1	12/11/2019 15:00	WG1394172



Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	U		350	2500	1	12/11/2019 17:08	WG1394715

Sample Narrative:

L1168711-03 WG1394715: Insufficient sample volume for DUP study.

Wet Chemistry by Method 1664A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
TPH - Oil & Grease	U		780	5380	1	12/12/2019 21:17	WG1395550

Sample Narrative:

L1168711-03 WG1395550: Insufficient sample volume for DUP study

Wet Chemistry by Method 4500H+ B-2011

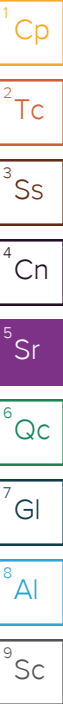
Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.56	T8	1	12/09/2019 20:00	WG1393571

Sample Narrative:

L1168711-03 WG1393571: 7.56 at 16.6C

Metals (ICPMS) by Method 200.8

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Aluminum	U		20.0	100	1	12/11/2019 14:17	WG1394172
Iron	34.9	J	15.0	100	1	12/11/2019 14:17	WG1394172
Lead	0.562	J	0.260	1.00	1	12/11/2019 14:17	WG1394172
Zinc	55.0		1.91	10.0	1	12/11/2019 14:17	WG1394172





Gravimetric Analysis by Method 2540 D-2011

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Suspended Solids	19000	J	3500	25000	1	12/12/2019 12:22	WG1395315

1 Cp

2 Tc

3 Ss

4 Cn

Wet Chemistry by Method 1664A

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
TPH - Oil & Grease	U		763	5260	1	12/12/2019 21:17	WG1395550

5 Sr

6 Qc

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	7.67	T8	1	12/11/2019 20:50	WG1394701

7 Gl

8 Al

Sample Narrative:

L1168711-04 WG1394701: 7.67 at 15.4C

9 Sc

Metals (ICPMS) by Method 200.8

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Aluminum	164		20.0	100	1	12/12/2019 15:00	WG1394538
Iron	327		15.0	100	1	12/12/2019 15:00	WG1394538
Lead	15.9		0.260	1.00	1	12/12/2019 15:00	WG1394538
Zinc	106		1.91	10.0	1	12/14/2019 11:55	WG1395905



Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	520	J	364	2600	1	12/12/2019 12:22	WG1395315

1 Cp

2 Tc

3 Ss

4 Cn

Wet Chemistry by Method 1664A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
TPH - Oil & Grease	U		806	5560	1	12/12/2019 21:17	WG1395550

5 Sr

6 Qc

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.56	T8	1	12/11/2019 20:50	WG1394701

7 Gl

8 Al

Sample Narrative:

L1168711-05 WG1394701: 7.56 at 15.4C

9 Sc

Metals (ICPMS) by Method 200.8

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Aluminum	U		20.0	100	1	12/12/2019 15:29	WG1394538
Iron	39.3	J	15.0	100	1	12/12/2019 15:29	WG1394538
Lead	0.761	B J	0.260	1.00	1	12/12/2019 15:29	WG1394538
Zinc	50.3		1.91	10.0	1	12/14/2019 11:58	WG1395905

Method Blank (MB)

(MB) R3481652-1 12/11/19 17:08

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	ug/l		ug/l	ug/l
Suspended Solids	U		350	2500

L1168712-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1168712-01 12/11/19 17:08 • (DUP) R3481652-3 12/11/19 17:08

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	ug/l	ug/l		%		%
Suspended Solids	16000	19000	1	17.1	J P1	5

L1168739-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1168739-01 12/11/19 17:08 • (DUP) R3481652-4 12/11/19 17:08

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	ug/l	ug/l		%		%
Suspended Solids	280000	296000	1	5.56	P1	5

Laboratory Control Sample (LCS)

(LCS) R3481652-2 12/11/19 17:08

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	ug/l	ug/l	%	%	
Suspended Solids	773000	868000	112	85.0-115	

1	Cp
2	Tc
3	Ss
4	Cn
5	Sr
6	Qc
7	Gl
8	Al
9	Sc

Method Blank (MB)

(MB) R3482510-1 12/12/19 12:22

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	ug/l		ug/l	ug/l
Suspended Solids	U		350	2500

1	Cp
2	Tc
3	Ss
4	Cn
5	Sr
6	Qc
7	Gl
8	Al
9	Sc

L1169152-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1169152-01 12/12/19 12:22 • (DUP) R3482510-3 12/12/19 12:22

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	ug/l	ug/l		%		%
Suspended Solids	328000	328000	1	0.000		5

L1169169-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1169169-03 12/12/19 12:22 • (DUP) R3482510-4 12/12/19 12:22

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	ug/l	ug/l		%		%
Suspended Solids	192000	176000	1	8.70	J3	5

Laboratory Control Sample (LCS)

(LCS) R3482510-2 12/12/19 12:22

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	ug/l	ug/l	%	%	
Suspended Solids	773000	796000	103	85.0-115	

Method Blank (MB)

(MB) R3481949-1 12/12/19 21:17

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
TPH - Oil & Grease	U		725	5000

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3481949-2 12/12/19 21:17 • (LCSD) R3481949-3 12/12/19 21:17

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
TPH - Oil & Grease	20000	17800	21000	89.0	105	64.0-132			16.5	34

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



L1167901-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1167901-01 12/09/19 20:00 • (DUP) R3480683-2 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.38	7.37	1	0.136		1

Sample Narrative:

OS: 7.38 at 16.2C

DUP: 7.37 at 16.2C

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L1168110-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1168110-01 12/09/19 20:00 • (DUP) R3480683-3 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.38	7.40	1	0.271		1

Sample Narrative:

OS: 7.38 at 15.2C

DUP: 7.4 at 15.2C

L1168110-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1168110-02 12/09/19 20:00 • (DUP) R3480683-4 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.40	7.41	1	0.135		1

Sample Narrative:

OS: 7.4 at 14.6C

DUP: 7.41 at 13.9C

L1168110-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1168110-03 12/09/19 20:00 • (DUP) R3480683-5 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.22	7.23	1	0.138		1

Sample Narrative:

L1168110-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1168110-03 12/09/19 20:00 • (DUP) R3480683-5 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
OS: 7.22 at 14.8C						
DUP: 7.23 at 14.2C						

¹Cp

²Tc

³Ss

⁴Cn

L1168110-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1168110-04 12/09/19 20:00 • (DUP) R3480683-6 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.25	7.26	1	0.138		1

⁵Sr

⁶Qc

Sample Narrative:

OS: 7.25 at 16.6C
DUP: 7.26 at 16.3C

⁷Gl

⁸Al

L1168110-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1168110-05 12/09/19 20:00 • (DUP) R3480683-7 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.23	7.28	1	0.689		1

⁹Sc

Sample Narrative:

OS: 7.23 at 14.8C
DUP: 7.28 at 13.5C

L1168110-06 Original Sample (OS) • Duplicate (DUP)

(OS) L1168110-06 12/09/19 20:00 • (DUP) R3480683-8 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.20	7.20	1	0.000		1

Sample Narrative:

OS: 7.2 at 14.2C
DUP: 7.2 at 14.2C

L1168110-07 Original Sample (OS) • Duplicate (DUP)

(OS) L1168110-07 12/09/19 20:00 • (DUP) R3480683-9 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.27	7.32	1	0.685		1

Sample Narrative:
OS: 7.27 at 160C
DUP: 7.32 at 16.2C

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc

L1168110-08 Original Sample (OS) • Duplicate (DUP)

(OS) L1168110-08 12/09/19 20:00 • (DUP) R3480683-10 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.33	7.34	1	0.136		1

Sample Narrative:
OS: 7.33 at 16.4C
DUP: 7.34 at 16.3C

L1168110-09 Original Sample (OS) • Duplicate (DUP)

(OS) L1168110-09 12/09/19 20:00 • (DUP) R3480683-11 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.24	7.25	1	0.138		1

Sample Narrative:
OS: 7.24 at 17.1C
DUP: 7.25 at 16.8C

L1168110-10 Original Sample (OS) • Duplicate (DUP)

(OS) L1168110-10 12/09/19 20:00 • (DUP) R3480683-12 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.20	7.20	1	0.000		1

Sample Narrative:

L1168110-10 Original Sample (OS) • Duplicate (DUP)

(OS) L1168110-10 12/09/19 20:00 • (DUP) R3480683-12 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
OS: 7.2 at 17.9C						
DUP: 7.2 at 17.6C						

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L1168110-11 Original Sample (OS) • Duplicate (DUP)

(OS) L1168110-11 12/09/19 20:00 • (DUP) R3480683-13 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.26	7.29	1	0.412		1

Sample Narrative:

OS: 7.26 at 17.7C
DUP: 7.29 at 17.8C

L1168157-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1168157-02 12/09/19 20:00 • (DUP) R3480683-14 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.30	7.34	1	0.546		1

Sample Narrative:

OS: 7.3 at 18.9C
DUP: 7.34 at 20C

L1168287-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1168287-02 12/09/19 20:00 • (DUP) R3480683-15 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	6.88	6.90	1	0.290		1

Sample Narrative:

OS: 6.88 at 19.3C
DUP: 6.9 at 14.6C



L1168322-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1168322-01 12/09/19 20:00 • (DUP) R3480683-16 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.24	7.27	1	0.414		1

Sample Narrative:

OS: 7.24 at 18.9C

DUP: 7.27 at 19.6C



L1168711-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1168711-01 12/09/19 20:00 • (DUP) R3480683-17 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.11	7.06	1	0.706		1

Sample Narrative:

OS: 7.11 at 17.1C

DUP: 7.06 at 17.1C

L1168711-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1168711-03 12/09/19 20:00 • (DUP) R3480683-18 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.56	7.57	1	0.132		1

Sample Narrative:

OS: 7.56 at 16.6C

DUP: 7.57 at 16.8C

L1168712-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1168712-01 12/09/19 20:00 • (DUP) R3480683-19 12/09/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.64	7.68	1	0.522		1

Sample Narrative:



L1168712-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1168712-01 12/09/19 20:00 • (DUP) R3480683-19 12/09/19 20:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
OS: 7.64 at 17.1C						
DUP: 7.68 at 16.8C						

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L1168712-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1168712-02 12/09/19 20:00 • (DUP) R3480683-20 12/09/19 20:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	7.40	7.41	1	0.135		1

Sample Narrative:

OS: 7.4 at 17.5C

DUP: 7.41 at 17.2C

L1168712-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1168712-03 12/09/19 20:00 • (DUP) R3480683-21 12/09/19 20:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	7.50	7.52	1	0.266		1

Sample Narrative:

OS: 7.5 at 17.6C

DUP: 7.52 at 17.5C

Laboratory Control Sample (LCS)

(LCS) R3480683-1 12/09/19 20:00

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	su	su	%	%	
pH	10.0	10.0	100	99.0-101	

Sample Narrative:

LCS: 10.01 at 19.8C

L1168157-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1168157-01 12/11/19 18:00 • (DUP) R3481560-2 12/11/19 18:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.34	7.33	1	0.136		1

Sample Narrative:
OS: 7.34 at 19.3C
DUP: 7.33 at 18.9C

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc

L1168168-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1168168-01 12/11/19 18:00 • (DUP) R3481560-3 12/11/19 18:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	8.56	8.57	1	0.117		1

Sample Narrative:
OS: 8.56 at 18.7C
DUP: 8.57 at 18.7C

L1168195-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1168195-02 12/11/19 18:00 • (DUP) R3481560-4 12/11/19 18:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.05	7.04	1	0.142		1

Sample Narrative:
OS: 7.05 at 19.2C
DUP: 7.04 at 19.1C

L1168195-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1168195-04 12/11/19 18:00 • (DUP) R3481560-5 12/11/19 18:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	10.5	10.5	1	0.000		1

Sample Narrative:



L1168195-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1168195-04 12/11/19 18:00 • (DUP) R3481560-5 12/11/19 18:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
OS: 10.46 at 20C						
DUP: 10.46 at 20C						

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L1168228-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1168228-01 12/11/19 18:00 • (DUP) R3481560-6 12/11/19 18:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	8.32	8.34	1	0.240		1

Sample Narrative:

OS: 8.32 at 18.7C

DUP: 8.34 at 19.2C

L1168300-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1168300-01 12/11/19 18:00 • (DUP) R3481560-7 12/11/19 18:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.13	7.18	1	0.699		1

Sample Narrative:

OS: 7.13 at 19C

DUP: 7.18 at 19.2C

L1168314-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1168314-01 12/11/19 18:00 • (DUP) R3481560-8 12/11/19 18:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	6.95	6.94	1	0.144		1

Sample Narrative:

OS: 6.95 at 18.6C

DUP: 6.94 at 18.5C



L1168314-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1168314-02 12/11/19 18:00 • (DUP) R3481560-9 12/11/19 18:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	6.47	6.45	1	0.310		1

Sample Narrative:

OS: 6.47 at 18.4C

DUP: 6.45 at 18.5C



L1168314-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1168314-03 12/11/19 18:00 • (DUP) R3481560-10 12/11/19 18:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	4.89	4.88	1	0.205		1

Sample Narrative:

OS: 4.89 at 18.3C

DUP: 4.88 at 18.5C

L1168314-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1168314-05 12/11/19 18:00 • (DUP) R3481560-11 12/11/19 18:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	5.08	5.07	1	0.197		1

Sample Narrative:

OS: 5.08 at 19.5C

DUP: 5.07 at 18.1C

L1168374-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1168374-01 12/11/19 18:00 • (DUP) R3481560-12 12/11/19 18:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.29	7.34	1	0.684		1

Sample Narrative:



L1168374-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1168374-01 12/11/19 18:00 • (DUP) R3481560-12 12/11/19 18:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
OS: 7.29 at 18.6C						
DUP: 7.34 at 19.7C						

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L1168462-14 Original Sample (OS) • Duplicate (DUP)

(OS) L1168462-14 12/11/19 18:00 • (DUP) R3481560-13 12/11/19 18:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.46	7.46	1	0.000		1

Sample Narrative:

OS: 7.46 at 18.7C

DUP: 7.46 at 18.8C

L1168494-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1168494-01 12/11/19 18:00 • (DUP) R3481560-14 12/11/19 18:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.75	7.77	1	0.258		1

Sample Narrative:

OS: 7.75 at 18.8C

DUP: 7.77 at 16.6C

L1168530-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1168530-01 12/11/19 18:00 • (DUP) R3481560-15 12/11/19 18:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	6.52	6.49	1	0.461		1

Sample Narrative:

OS: 6.52 at 18.7C

DUP: 6.49 at 18.5C



L1168530-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1168530-02 12/11/19 18:00 • (DUP) R3481560-16 12/11/19 18:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	6.95	6.96	1	0.144		1

Sample Narrative:

OS: 6.95 at 18.3C
DUP: 6.96 at 18.3C



L1168532-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1168532-02 12/11/19 18:00 • (DUP) R3481560-17 12/11/19 18:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.71	7.73	1	0.259		1

Sample Narrative:

OS: 7.71 at 18.4C
DUP: 7.73 at 17.1C

L1168568-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1168568-02 12/11/19 18:00 • (DUP) R3481560-18 12/11/19 18:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	6.67	6.68	1	0.150		1

Sample Narrative:

OS: 6.67 at 18C
DUP: 6.68 at 17.3C

L1168711-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1168711-02 12/11/19 18:00 • (DUP) R3481560-19 12/11/19 18:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.59	7.63	1	0.526		1

Sample Narrative:



L1168711-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1168711-02 12/11/19 18:00 • (DUP) R3481560-19 12/11/19 18:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
OS: 7.59 at 18.1C						
DUP: 7.63 at 18.9C						

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L1169134-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1169134-01 12/11/19 18:00 • (DUP) R3481560-20 12/11/19 18:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	9.57	9.59	1	0.209		1

Sample Narrative:

OS: 9.57 at 18.3C

DUP: 9.59 at 19.1C

L1169137-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1169137-01 12/11/19 18:00 • (DUP) R3481560-21 12/11/19 18:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	9.87	9.87	1	0.000		1

Sample Narrative:

OS: 9.87 at 18.4C

DUP: 9.87 at 19.6C

Laboratory Control Sample (LCS)

(LCS) R3481560-1 12/11/19 18:00

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	su	su	%	%	
pH	10.0	10.0	100	99.0-101	

Sample Narrative:

LCS: 10.03 at 17.3C



L1168381-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1168381-01 12/11/19 20:50 • (DUP) R3481494-5 12/11/19 20:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.86	7.86	1	0.000		1

Sample Narrative:

OS: 7.86 at 15C

DUP: 7.86 at 15.1C



L1168711-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1168711-04 12/11/19 20:50 • (DUP) R3481494-6 12/11/19 20:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.67	7.67	1	0.000		1

Sample Narrative:

OS: 7.67 at 15.4C

DUP: 7.67 at 15.8C

L1168711-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1168711-05 12/11/19 20:50 • (DUP) R3481494-7 12/11/19 20:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.56	7.58	1	0.264		1

Sample Narrative:

OS: 7.56 at 15.4C

DUP: 7.58 at 15.8C

L1168712-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1168712-04 12/11/19 20:50 • (DUP) R3481494-8 12/11/19 20:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	8.49	8.50	1	0.118		1

Sample Narrative:



L1168712-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1168712-04 12/11/19 20:50 • (DUP) R3481494-8 12/11/19 20:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
OS: 8.49 at 15.2C						
DUP: 8.5 at 15.3C						

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L1168740-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1168740-01 12/11/19 20:50 • (DUP) R3481494-9 12/11/19 20:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.39	7.39	1	0.000		1

Sample Narrative:

OS: 7.39 at 17.7C

DUP: 7.39 at 17.6C

L1168785-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1168785-01 12/11/19 20:50 • (DUP) R3481494-10 12/11/19 20:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.53	7.54	1	0.133		1

Sample Narrative:

OS: 7.53 at 14.5C

DUP: 7.54 at 14.5C

L1168786-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1168786-01 12/11/19 20:50 • (DUP) R3481494-11 12/11/19 20:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	6.22	6.21	1	0.161		1

Sample Narrative:

OS: 6.22 at 15.6C

DUP: 6.21 at 15.5C



L1168787-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1168787-01 12/11/19 20:50 • (DUP) R3481494-12 12/11/19 20:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	6.10	6.11	1	0.164		1

Sample Narrative:

OS: 6.1 at 15C

DUP: 6.11 at 15.1C



L1168792-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1168792-01 12/11/19 20:50 • (DUP) R3481494-13 12/11/19 20:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	8.56	8.56	1	0.000		1

Sample Narrative:

OS: 8.56 at 17.6C

DUP: 8.56 at 17.6C

L1168800-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1168800-01 12/11/19 20:50 • (DUP) R3481494-14 12/11/19 20:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	8.58	8.57	1	0.117		1

Sample Narrative:

OS: 8.58 at 15.4C

DUP: 8.57 at 15.3C

L1169147-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1169147-01 12/11/19 20:50 • (DUP) R3481494-15 12/11/19 20:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	8.29	8.30	1	0.121		1

Sample Narrative:



L1169147-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1169147-01 12/11/19 20:50 • (DUP) R3481494-15 12/11/19 20:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
OS: 8.29 at 17.9C						
DUP: 8.3 at 17.8C						

¹Cp

²Tc

³Ss

⁴Cn

L1169161-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1169161-02 12/11/19 20:50 • (DUP) R3481494-16 12/11/19 20:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	8.96	8.97	1	0.112		1

⁵Sr

⁶Qc

Sample Narrative:

OS: 8.96 at 15.6C

DUP: 8.97 at 15.5C

⁷Gl

⁸Al

L1169197-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1169197-01 12/11/19 20:50 • (DUP) R3481494-17 12/11/19 20:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	8.00	8.00	1	0.000		1

⁹Sc

Sample Narrative:

OS: 8 at 16.1C

DUP: 8 at 16.2C

L1169198-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1169198-02 12/11/19 20:50 • (DUP) R3481494-18 12/11/19 20:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.97	7.96	1	0.126		1

Sample Narrative:

OS: 7.97 at 16C

DUP: 7.96 at 16.7C

L1169201-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1169201-02 12/11/19 20:50 • (DUP) R3481494-19 12/11/19 20:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	6.53	6.53	1	0.000		1

Sample Narrative:

OS: 6.53 at 15.9C
DUP: 6.53 at 16C

L1169306-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1169306-01 12/11/19 20:50 • (DUP) R3481494-20 12/11/19 20:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	6.64	6.67	1	0.451		1

Sample Narrative:

OS: 6.64 at 17.3C
DUP: 6.67 at 17.4C

L1169306-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1169306-02 12/11/19 20:50 • (DUP) R3481494-21 12/11/19 20:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	8.76	8.68	1	0.917		1

Sample Narrative:

OS: 8.76 at 17.2C
DUP: 8.68 at 17.1C

Laboratory Control Sample (LCS)

(LCS) R3481494-1 12/11/19 20:50

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	su	su	%	%	
pH	10.0	10.0	100	99.0-101	

Sample Narrative:

LCS: 10.01 at 18C





Method Blank (MB)

(MB) R3481402-1 12/11/19 14:07

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Aluminum	U		20.0	100
Iron	U		15.0	100
Lead	U		0.260	1.00
Zinc	U		1.91	10.0

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3481402-2 12/11/19 14:11 • (LCSD) R3481402-3 12/11/19 14:14

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Aluminum	5000	4820	4910	96.5	98.2	85.0-115			1.78	20
Iron	5000	4850	4940	96.9	98.8	85.0-115			1.94	20
Lead	50.0	48.5	50.6	97.0	101	85.0-115			4.18	20
Zinc	50.0	49.7	51.5	99.3	103	85.0-115			3.59	20

L1168711-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1168711-03 12/11/19 14:17 • (MS) R3481402-5 12/11/19 14:24 • (MSD) R3481402-6 12/11/19 14:27

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum	5000	U	4810	5070	96.1	101	1	70.0-130			5.34	20
Iron	5000	34.9	4830	5000	95.9	99.4	1	70.0-130			3.56	20
Lead	50.0	0.562	50.6	51.6	100	102	1	70.0-130			1.95	20
Zinc	50.0	55.0	101	104	93.0	98.6	1	70.0-130			2.71	20

L1168815-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1168815-01 12/11/19 14:31 • (MS) R3481402-7 12/11/19 14:34 • (MSD) R3481402-8 12/11/19 14:37

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum	5000	360	5300	5310	98.8	98.9	1	70.0-130			0.146	20
Iron	5000	ND	5300	5140	104	101	1	70.0-130			2.98	20
Lead	50.0	ND	53.2	50.0	106	99.3	1	70.0-130			6.29	20
Zinc	50.0	45.6	92.0	96.9	92.8	103	1	70.0-130			5.20	20



Method Blank (MB)

(MB) R3481875-1 12/12/19 14:50

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	ug/l		ug/l	ug/l
Aluminum	U		20.0	100
Iron	U		15.0	100
Lead	0.354	J	0.260	1.00

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3481875-2 12/12/19 14:53 • (LCSD) R3481875-3 12/12/19 14:57

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	ug/l	ug/l	ug/l	%	%	%			%	%
Aluminum	5000	5500	5400	110	108	85.0-115			1.80	20
Iron	5000	5460	5410	109	108	85.0-115			0.850	20
Lead	50.0	53.8	55.5	108	111	85.0-115			2.99	20

L1168711-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1168711-04 12/12/19 15:00 • (MS) R3481875-5 12/12/19 15:06 • (MSD) R3481875-6 12/12/19 15:10

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	ug/l	ug/l	ug/l	ug/l	%	%		%			%	%
Aluminum	5000	164	5450	5720	106	111	1	70.0-130			4.86	20
Iron	5000	327	5830	5760	110	109	1	70.0-130			1.18	20
Lead	50.0	15.9	68.8	70.0	106	108	1	70.0-130			1.73	20

L1169410-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1169410-01 12/12/19 15:13 • (MS) R3481875-7 12/12/19 15:16 • (MSD) R3481875-8 12/12/19 15:19

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	ug/l	ug/l	ug/l	ug/l	%	%		%			%	%
Aluminum	5000	144	5170	5220	100	101	1	70.0-130			0.888	20
Iron	5000	27.5	5230	5160	104	103	1	70.0-130			1.41	20
Lead	50.0	0.459	50.9	51.5	101	102	1	70.0-130			1.26	20



Method Blank (MB)

(MB) R3482357-1 12/14/19 11:32

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Zinc	U		1.91	10.0

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3482357-2 12/14/19 11:35 • (LCSD) R3482357-3 12/14/19 11:38

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Zinc	50.0	48.5	49.2	96.9	98.5	85.0-115			1.60	20

L1169450-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1169450-02 12/14/19 11:42 • (MS) R3482357-5 12/14/19 11:48 • (MSD) R3482357-6 12/14/19 11:52

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Zinc	50.0	17.5	62.1	63.0	89.1	90.9	1	70.0-130			1.48	20



Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier Description

B	The same analyte is found in the associated blank.
J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
T8	Sample(s) received past/too close to holding time expiration.

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 G

8 Al

9 Sc



Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico ¹	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1 6}	90010	South Carolina	84004
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1 4}	2006
Louisiana ¹	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

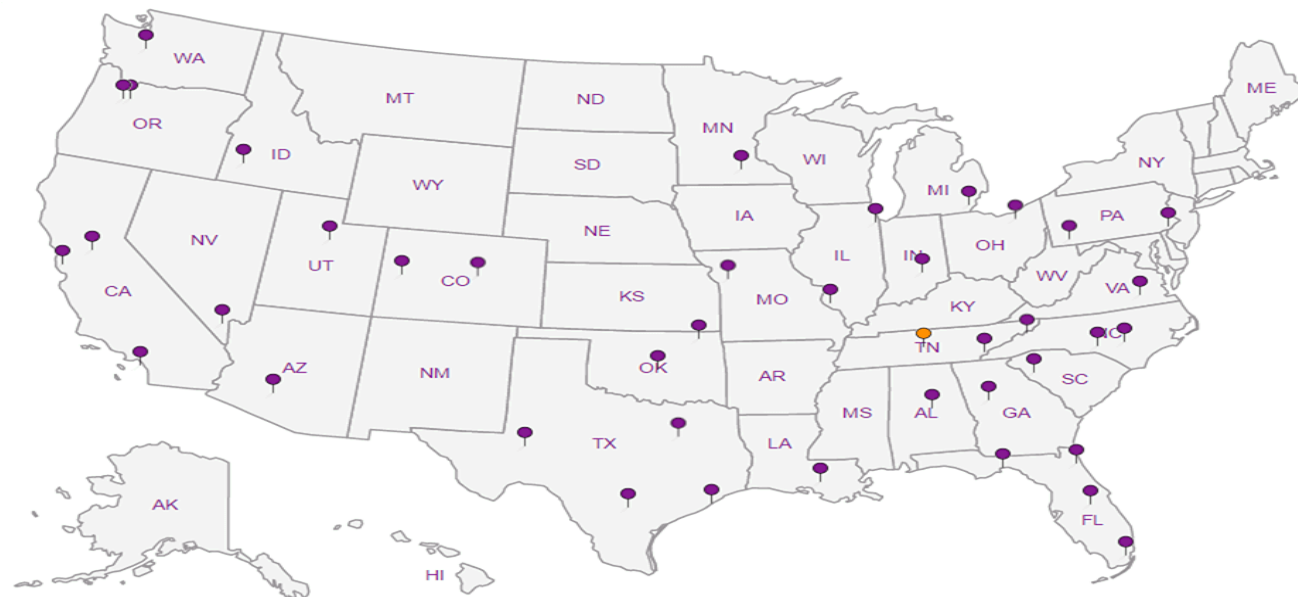
Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP, LLC EMLAP	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ⁶ Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



G181

LABORATORY: ESC Laboratory 12065 Lebanon Road, Mt. Juliet, TN 37122 (615) 773-9772 Brian Ford						INSTRUCTIONS FOR LAB PERSONNEL: Please send analytic results, electronic deliverables and the original chain-of-custody form to: bas@cdimengineering.com , mec@cdimengineering.com sab@cdimengineering.com						Analysis Turnaround Time X Standard <input type="checkbox"/> Other _____ GeoTracker EDF required? <input type="checkbox"/> Yes X No LOCUS EDD required? <input type="checkbox"/> Yes X No Report Results to: <input type="checkbox"/> RL X MDL Report soil results to: <input type="checkbox"/> wet weight (total) <input type="checkbox"/> dry weight						Specify analytic/prep method and detection limit in report. Notify us of any anomalous peaks in GC or other scans. Call immediately with any questions or problems.							
CDIM CONTACT: CDIM Engineering 45 Polk Street, 3rd Floor San Francisco, California 94102						Project Manager: Bryan Starks Phone Number 415-498-0535 Sampled by: BS Sample date(s): 12/7/19						ANALYSIS REQUESTED												COC Number:	
PROJECT INFORMATION Job Name: LRTC Industrial Stormwater Job #: 101-004 Address: 402 Wright Avenue, Richmond CA 94804						pH (SM 4500HB) Total Suspended Solids (SM 2540D) Oil & Grease (EPA 1664A SGT-HEM) Total Metals- Al, Fe, Pb, Zn (EPA 200.8 ICP-MS)																		Page 1 of 1	
																								SDG number:	
																								Sample Specific Notes:	
Lab ID	Sample Identification	Sample Date	Sample Time	Sample Matrix	# of Cont.	X	X	X	X														L1168711		
	TS1-E- 191207	12/7/19	8:15	W	4	X	X	X	X																
	TS2-E- 191207	12/7/19	8:45	W	4	X	X	X	X																
	TS3-E- 191207	12/7/19	8:20	W	4	X	X	X	X														01		
	TS4-E- 191207	12/7/19	9:47	W	4	X	X	X	X														02		
	TSX-E- 191207	12/7/19	8:14	W	4	X	X	X	X														Perform MS/MSD using additional volume provided		
Field Filtered (X):																									
Preservation Used: 1= Ice, 2= HCl; 3= H ₂ SO ₄ ; 4=HNO ₃ ; 5=NaOH; 6= Other _____						1	1	1, 3	1, 4																
Special Instructions/QC Requirements & Comments: Level II Report. Report with reporting limit and method detection limit. Analyze and report only the metals listed above.																									
Relinquished by: [Signature] Company: CDIM Date/Time: 12/7/19 1025 Received by: [Signature] Company: Date/Time:																									
Relinquished by: [Signature] Company: Date/Time: Received by: [Signature] Company: Date/Time:																									
Relinquished by: [Signature] Company: Date/Time: Received by: [Signature] Company: Date/Time:																									
x = Samples released to a secured, locked area.												● = Samples received from a secured, locked area													
SAMPLERS NAME Bryan Starks MOBILE # 8082569230						DATE / TIME 12/7/19 1025																			
SAMPLERS SIGNATURE [Signature]																									

CDIM Engineering - San Francisco, CA

Sample Delivery Group: L1172929
Samples Received: 12/20/2019
Project Number:
Description: LRTC Industrial Stormwater

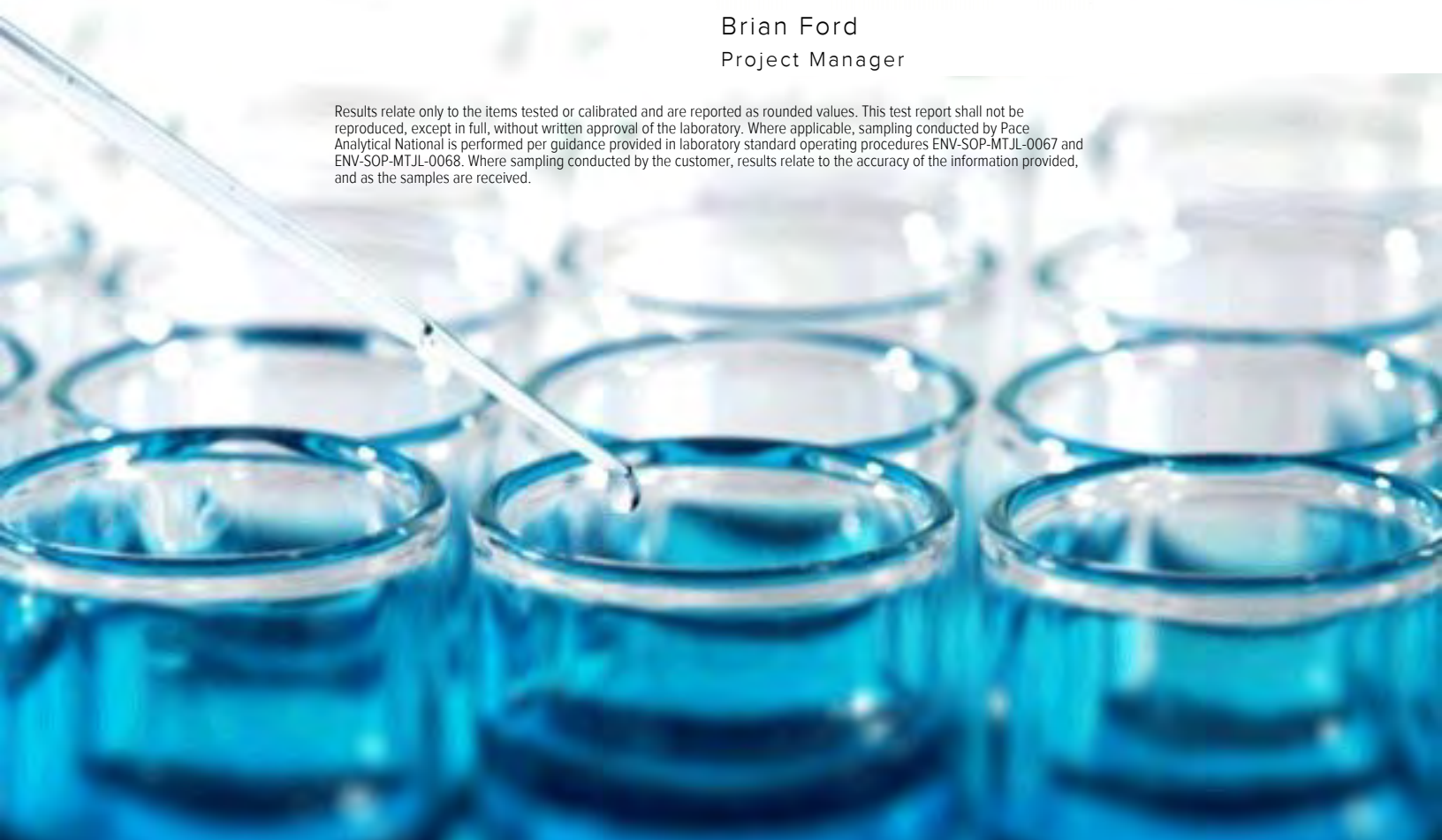
Report To: Bryan Starks
45 Polk Street
3rd Floor
San Francisco, CA 94102

Entire Report Reviewed By:

Brian Ford

Brian Ford
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.





Cp: Cover Page	1
Tc: Table of Contents	2
Ss: Sample Summary	3
Cn: Case Narrative	4
Sr: Sample Results	5
TS1-I-191218 L1172929-01	5
TS2-I-191218 L1172929-02	6
TS3-I-191218 L1172929-03	7
TS4-I-191218 L1172929-04	8
Qc: Quality Control Summary	9
Gravimetric Analysis by Method 2540 D-2011	9
Wet Chemistry by Method 1664A	11
Wet Chemistry by Method 4500H+ B-2011	12
Metals (ICPMS) by Method 200.8	13
Gl: Glossary of Terms	14
Al: Accreditations & Locations	15
Sc: Sample Chain of Custody	16



SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



TS1-I-191218 L1172929-01 WW

Collected by
Bryan Starks

Collected date/time
12/18/19 10:00

Received date/time
12/20/19 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 D-2011	WG1401139	1	12/22/19 11:38	12/22/19 12:51	TH	Mt. Juliet, TN
Wet Chemistry by Method 1664A	WG1402921	1	12/26/19 15:22	12/27/19 14:15	MBP	Mt. Juliet, TN
Wet Chemistry by Method 4500H+ B-2011	WG1400533	1	12/21/19 21:00	12/21/19 21:00	MSP	Mt. Juliet, TN
Metals (ICPMS) by Method 200.8	WG1400655	1	12/21/19 11:24	12/21/19 18:56	LD	Mt. Juliet, TN

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

TS2-I-191218 L1172929-02 WW

Collected by
Bryan Starks

Collected date/time
12/18/19 10:55

Received date/time
12/20/19 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 D-2011	WG1401139	1	12/22/19 11:38	12/22/19 12:51	TH	Mt. Juliet, TN
Wet Chemistry by Method 1664A	WG1402921	1	12/26/19 15:22	12/27/19 14:15	MBP	Mt. Juliet, TN
Wet Chemistry by Method 4500H+ B-2011	WG1400533	1	12/21/19 21:00	12/21/19 21:00	MSP	Mt. Juliet, TN
Metals (ICPMS) by Method 200.8	WG1400655	1	12/21/19 11:24	12/21/19 18:59	LD	Mt. Juliet, TN

TS3-I-191218 L1172929-03 WW

Collected by
Bryan Starks

Collected date/time
12/18/19 11:15

Received date/time
12/20/19 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 D-2011	WG1400986	1	12/21/19 16:43	12/21/19 21:00	TH	Mt. Juliet, TN
Wet Chemistry by Method 1664A	WG1402921	1	12/26/19 15:22	12/27/19 14:15	MBP	Mt. Juliet, TN
Wet Chemistry by Method 4500H+ B-2011	WG1400533	1	12/21/19 21:00	12/21/19 21:00	MSP	Mt. Juliet, TN
Metals (ICPMS) by Method 200.8	WG1400655	1	12/21/19 11:24	12/21/19 19:02	LD	Mt. Juliet, TN

TS4-I-191218 L1172929-04 WW

Collected by
Bryan Starks

Collected date/time
12/18/19 11:30

Received date/time
12/20/19 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 D-2011	WG1400986	1	12/21/19 16:43	12/21/19 21:00	TH	Mt. Juliet, TN
Wet Chemistry by Method 1664A	WG1402921	1	12/26/19 15:22	12/27/19 14:15	MBP	Mt. Juliet, TN
Wet Chemistry by Method 4500H+ B-2011	WG1400533	1	12/21/19 21:00	12/21/19 21:00	MSP	Mt. Juliet, TN
Metals (ICPMS) by Method 200.8	WG1400655	1	12/21/19 11:24	12/21/19 19:05	LD	Mt. Juliet, TN

ACCOUNT:

CDIM Engineering - San Francisco, CA

PROJECT:

SDG:

L1172929

DATE/TIME:

12/27/19 15:53

PAGE:

3 of 17



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Brian Ford
Project Manager

¹ Cp² Tc³ Ss⁴ Cn⁵ Sr⁶ Qc⁷ Gl⁸ Al⁹ Sc



Gravimetric Analysis by Method 2540 D-2011

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Suspended Solids	38000		3500	25000	1	12/22/2019 12:51	WG1401139

1 Cp

2 Tc

3 Ss

4 Cn

Wet Chemistry by Method 1664A

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
TPH - Oil & Grease	U		763	5260	1	12/27/2019 14:15	WG1402921

5 Sr

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	8.14	T8	1	12/21/2019 21:00	WG1400533

6 Qc

7 Gl

Sample Narrative:

L1172929-01 WG1400533: 8.14 at 19.4C

8 Al

Metals (ICPMS) by Method 200.8

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Aluminum	1350		20.0	100	1	12/21/2019 18:56	WG1400655
Iron	9460		15.0	100	1	12/21/2019 18:56	WG1400655
Lead	205		0.260	1.00	1	12/21/2019 18:56	WG1400655
Zinc	1190		1.91	10.0	1	12/21/2019 18:56	WG1400655

9 Sc



Gravimetric Analysis by Method 2540 D-2011

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Suspended Solids	790000		17500	125000	1	12/22/2019 12:51	WG1401139

1 Cp

2 Tc

3 Ss

4 Cn

Wet Chemistry by Method 1664A

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
TPH - Oil & Grease	U		788	5440	1	12/27/2019 14:15	WG1402921

5 Sr

6 Qc

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	7.58	T8	1	12/21/2019 21:00	WG1400533

7 Gl

8 Al

Sample Narrative:

L1172929-02 WG1400533: 7.58 at 19.3C

Metals (ICPMS) by Method 200.8

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Aluminum	144		20.0	100	1	12/21/2019 18:59	WG1400655
Iron	342		15.0	100	1	12/21/2019 18:59	WG1400655
Lead	4.63		0.260	1.00	1	12/21/2019 18:59	WG1400655
Zinc	65.6		1.91	10.0	1	12/21/2019 18:59	WG1400655

9 Sc



Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	15900		350	2500	1	12/21/2019 21:00	WG1400986

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Wet Chemistry by Method 1664A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
TPH - Oil & Grease	U		763	5260	1	12/27/2019 14:15	WG1402921

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	6.88	T8	1	12/21/2019 21:00	WG1400533

Sample Narrative:

L1172929-03 WG1400533: 6.88 at 19.1C

Metals (ICPMS) by Method 200.8

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Aluminum	206		20.0	100	1	12/21/2019 19:02	WG1400655
Iron	1050		15.0	100	1	12/21/2019 19:02	WG1400655
Lead	22.3		0.260	1.00	1	12/21/2019 19:02	WG1400655
Zinc	125		1.91	10.0	1	12/21/2019 19:02	WG1400655



Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	11900		350	2500	1	12/21/2019 21:00	WG1400986

1 Cp

2 Tc

3 Ss

4 Cn

Wet Chemistry by Method 1664A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
TPH - Oil & Grease	U		747	5150	1	12/27/2019 14:15	WG1402921

5 Sr

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.74	T8	1	12/21/2019 21:00	WG1400533

6 Qc

7 Gl

Sample Narrative:

L1172929-04 WG1400533: 7.74 at 19.6C

8 Al

Metals (ICPMS) by Method 200.8

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Aluminum	268		20.0	100	1	12/21/2019 19:05	WG1400655
Iron	336		15.0	100	1	12/21/2019 19:05	WG1400655
Lead	2.75		0.260	1.00	1	12/21/2019 19:05	WG1400655
Zinc	19.0		1.91	10.0	1	12/21/2019 19:05	WG1400655

9 Sc

Method Blank (MB)

(MB) R3484942-1 12/21/19 21:00

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	ug/l		ug/l	ug/l
Suspended Solids	U		350	2500

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc

L1173054-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1173054-01 12/21/19 21:00 • (DUP) R3484942-3 12/21/19 21:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	ug/l	ug/l		%		%
Suspended Solids	800000	950000	1	17.1	P1	5

L1173304-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1173304-02 12/21/19 21:00 • (DUP) R3484942-4 12/21/19 21:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	ug/l	ug/l		%		%
Suspended Solids	9000	11600	1	25.2	P1	5

Laboratory Control Sample (LCS)

(LCS) R3484942-2 12/21/19 21:00

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	ug/l	ug/l	%	%	
Suspended Solids	773000	800000	103	85.0-115	



Method Blank (MB)

(MB) R3485110-1 12/22/19 12:51

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	ug/l		ug/l	ug/l
Suspended Solids	U		350	2500

L1172884-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1172884-01 12/22/19 12:51 • (DUP) R3485110-3 12/22/19 12:51

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	ug/l	ug/l		%		%
Suspended Solids	5500000	5140000	1	6.77	J3	5

L1172928-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1172928-01 12/22/19 12:51 • (DUP) R3485110-4 12/22/19 12:51

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	ug/l	ug/l		%		%
Suspended Solids	2180000	2120000	1	2.79		5

Laboratory Control Sample (LCS)

(LCS) R3485110-2 12/22/19 12:51

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	ug/l	ug/l	%	%	
Suspended Solids	773000	812000	105	85.0-115	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R3486403-1 12/27/19 14:15

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
TPH - Oil & Grease	U		725	5000

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3486403-2 12/27/19 14:15 • (LCSD) R3486403-3 12/27/19 14:15

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
TPH - Oil & Grease	20000	15200	16300	76.0	81.5	64.0-132			6.98	34

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

L1172885-10 Original Sample (OS) • Duplicate (DUP)

(OS) L1172885-10 12/21/19 21:00 • (DUP) R3484881-2 12/21/19 21:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	6.94	6.95	1	0.144		1

Sample Narrative:
OS: 6.94 at 19.5C
DUP: 6.95 at 19.6C

1
Cp

2
Tc

3
Ss

4
Cn

5
Sr

6
Qc

7
Gl

8
Al

9
Sc

L1172929-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1172929-04 12/21/19 21:00 • (DUP) R3484881-3 12/21/19 21:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.74	7.75	1	0.129		1

Sample Narrative:
OS: 7.74 at 19.6C
DUP: 7.75 at 19.5C

Laboratory Control Sample (LCS)

(LCS) R3484881-1 12/21/19 21:00

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	su	su	%	%	
pH	10.0	10.0	100	99.0-101	

Sample Narrative:
LCS: 10.01 at 18.6C



Method Blank (MB)

(MB) R3485021-1 12/21/19 17:43

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Aluminum	U		20.0	100
Iron	U		15.0	100
Lead	U		0.260	1.00
Zinc	U		1.91	10.0

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3485021-2 12/21/19 17:47 • (LCSD) R3485021-3 12/21/19 17:50

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Aluminum	5000	4690	4610	93.8	92.1	85.0-115			1.78	20
Iron	5000	5010	5050	100	101	85.0-115			0.765	20
Lead	50.0	45.0	46.4	90.1	92.9	85.0-115			3.04	20
Zinc	50.0	48.1	48.8	96.3	97.5	85.0-115			1.28	20

L1172870-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1172870-01 12/21/19 17:53 • (MS) R3485021-5 12/21/19 18:00 • (MSD) R3485021-6 12/21/19 18:03

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum	5000	ND	4680	4800	92.8	95.1	1	70.0-130			2.37	20
Iron	5000	144	5210	5330	101	104	1	70.0-130			2.19	20
Lead	50.0	ND	51.7	47.1	103	94.2	1	70.0-130			9.23	20
Zinc	50.0	16.2	61.4	61.8	90.5	91.3	1	70.0-130			0.664	20

L1173213-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1173213-01 12/21/19 18:06 • (MS) R3485021-7 12/21/19 18:10 • (MSD) R3485021-8 12/21/19 18:13

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum	5000	ND	4660	4630	93.2	92.7	1	70.0-130			0.564	20
Iron	5000	ND	5170	5210	103	103	1	70.0-130			0.644	20
Lead	50.0	ND	47.1	46.5	94.2	93.0	1	70.0-130			1.22	20
Zinc	50.0	12.9	60.1	58.8	94.3	91.8	1	70.0-130			2.03	20



Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier Description

J3	The associated batch QC was outside the established quality control range for precision.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
T8	Sample(s) received past/too close to holding time expiration.

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gi

8 Ai

9 Sc



Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico ¹	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1 6}	90010	South Carolina	84004
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1 4}	2006
Louisiana ¹	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

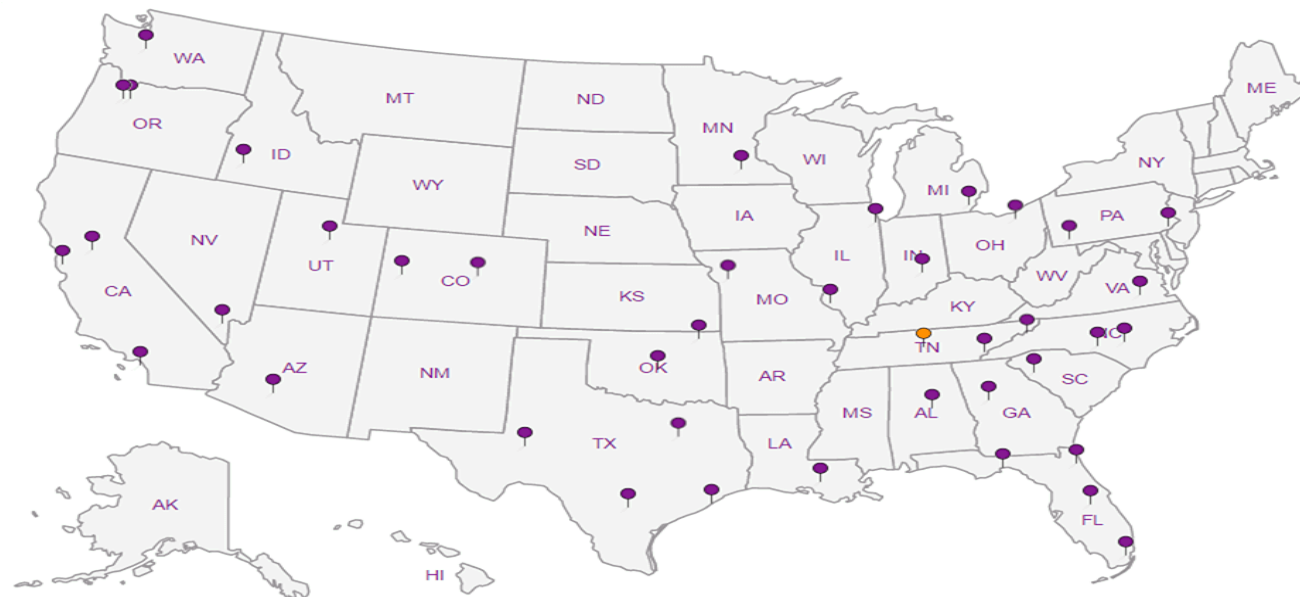
Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP, LLC EMLAP	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ⁶ Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



CHAIN OF CUSTODY RECORD

Pace Analytical National Center for Testing & Innovation
Cooler Receipt Form

Client: <i>CDIENGSR</i>	1572929		
Cooler Received/Opened On: 12/30/19	Temperature: 2		
Received By: Tanner Windham			
Signature: <i>TW</i>			
Receipt Check List	NP	Yes	No
COC Seal Present / Intact?	/		
COC Signed / Accurate?		/	
Bottles arrive intact?		/	
Correct bottles used?		/	
Sufficient volume sent?		/	
If Applicable			
VOA Zero headspace?			
Preservation Correct / Checked?			

December 30, 2019

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

CDIM Engineering - San Francisco, CA

Sample Delivery Group: L1172918
Samples Received: 12/20/2019
Project Number:
Description: LRTC Industrial Stormwater

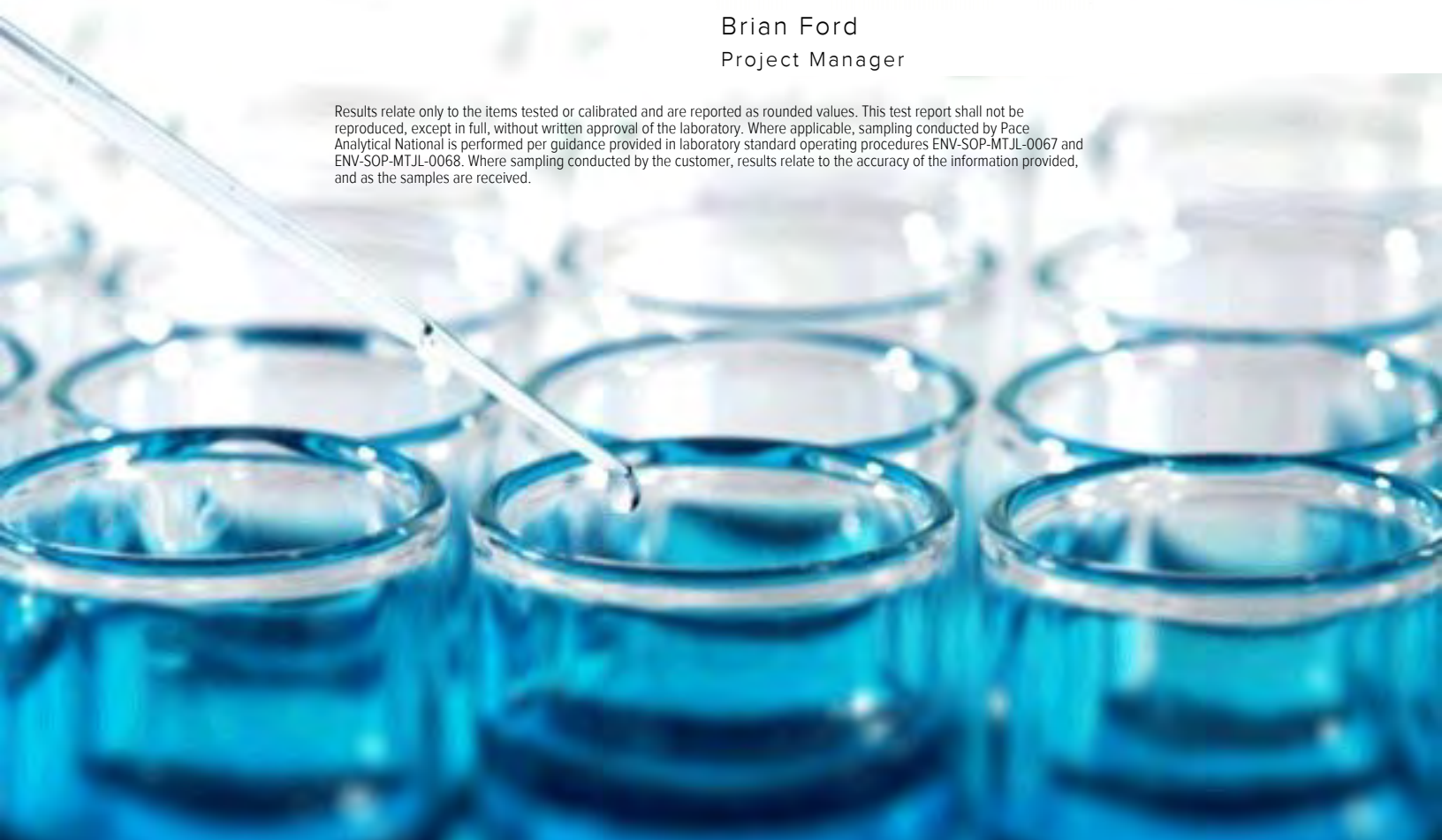
Report To: Bryan Starks
45 Polk Street
3rd Floor
San Francisco, CA 94102

Entire Report Reviewed By:

Brian Ford

Brian Ford
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.





Cp: Cover Page	1
Tc: Table of Contents	2
Ss: Sample Summary	3
Cn: Case Narrative	4
Sr: Sample Results	5
TS1-E-191218 L1172918-01	5
TS2-E-191218 L1172918-02	6
TS3-E-191218 L1172918-03	7
TS4-E-191218 L1172918-04	8
TSX-E-191218 L1172918-05	9
Qc: Quality Control Summary	10
Gravimetric Analysis by Method 2540 D-2011	10
Wet Chemistry by Method 1664A	11
Wet Chemistry by Method 4500H+ B-2011	12
Metals (ICPMS) by Method 200.8	13
Gl: Glossary of Terms	14
Al: Accreditations & Locations	15
Sc: Sample Chain of Custody	16



SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



TS1-E-191218 L1172918-01 WW

Collected by
Bryan Starks

Collected date/time
12/18/19 10:36

Received date/time
12/20/19 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 D-2011	WG1400986	1	12/21/19 16:43	12/21/19 21:00	TH	Mt. Juliet, TN
Wet Chemistry by Method 1664A	WG1402921	1	12/26/19 15:22	12/27/19 14:15	MBP	Mt. Juliet, TN
Wet Chemistry by Method 4500H+ B-2011	WG1400533	1	12/21/19 21:00	12/21/19 21:00	MSP	Mt. Juliet, TN
Metals (ICPMS) by Method 200.8	WG1400655	1	12/21/19 11:24	12/21/19 18:33	LD	Mt. Juliet, TN

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

TS2-E-191218 L1172918-02 WW

Collected by
Bryan Starks

Collected date/time
12/18/19 10:49

Received date/time
12/20/19 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 D-2011	WG1400986	1	12/21/19 16:43	12/21/19 21:00	TH	Mt. Juliet, TN
Wet Chemistry by Method 1664A	WG1402921	1	12/26/19 15:22	12/27/19 14:15	MBP	Mt. Juliet, TN
Wet Chemistry by Method 4500H+ B-2011	WG1400533	1	12/21/19 21:00	12/21/19 21:00	MSP	Mt. Juliet, TN
Metals (ICPMS) by Method 200.8	WG1400655	1	12/21/19 11:24	12/21/19 18:36	LD	Mt. Juliet, TN

TS3-E-191218 L1172918-03 WW

Collected by
Bryan Starks

Collected date/time
12/18/19 11:26

Received date/time
12/20/19 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 D-2011	WG1400986	1	12/21/19 16:43	12/21/19 21:00	TH	Mt. Juliet, TN
Wet Chemistry by Method 1664A	WG1402921	1	12/26/19 15:22	12/27/19 14:15	MBP	Mt. Juliet, TN
Wet Chemistry by Method 4500H+ B-2011	WG1400533	1	12/21/19 21:00	12/21/19 21:00	MSP	Mt. Juliet, TN
Metals (ICPMS) by Method 200.8	WG1400655	1	12/21/19 11:24	12/21/19 18:39	LD	Mt. Juliet, TN

TS4-E-191218 L1172918-04 WW

Collected by
Bryan Starks

Collected date/time
12/18/19 11:25

Received date/time
12/20/19 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 D-2011	WG1400986	1	12/21/19 16:43	12/21/19 21:00	TH	Mt. Juliet, TN
Wet Chemistry by Method 1664A	WG1402921	1	12/26/19 15:22	12/27/19 14:15	MBP	Mt. Juliet, TN
Wet Chemistry by Method 4500H+ B-2011	WG1400533	1	12/21/19 21:00	12/21/19 21:00	MSP	Mt. Juliet, TN
Metals (ICPMS) by Method 200.8	WG1400655	1	12/21/19 11:24	12/21/19 18:42	LD	Mt. Juliet, TN

TSX-E-191218 L1172918-05 WW

Collected by
Bryan Starks

Collected date/time
12/18/19 11:27

Received date/time
12/20/19 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 D-2011	WG1400986	1	12/21/19 16:43	12/21/19 21:00	TH	Mt. Juliet, TN
Wet Chemistry by Method 1664A	WG1402921	1	12/26/19 15:22	12/27/19 14:15	AMG	Mt. Juliet, TN
Wet Chemistry by Method 4500H+ B-2011	WG1400533	1	12/21/19 21:00	12/21/19 21:00	MSP	Mt. Juliet, TN
Metals (ICPMS) by Method 200.8	WG1400655	1	12/21/19 11:24	12/21/19 18:46	LD	Mt. Juliet, TN

ACCOUNT:

CDIM Engineering - San Francisco, CA

PROJECT:

SDG:

L1172918

DATE/TIME:

12/30/19 09:55

PAGE:

3 of 18



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Brian Ford
Project Manager

¹ Cp² Tc³ Ss⁴ Cn⁵ Sr⁶ Qc⁷ Gl⁸ Al⁹ Sc



Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	U		357	2550	1	12/21/2019 21:00	WG1400986

Sample Narrative:

L1172918-01 WG1400986: Reporting limit determined by filtrate volume.

Wet Chemistry by Method 1664A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
TPH - Oil & Grease	U		780	5380	1	12/27/2019 14:15	WG1402921

Wet Chemistry by Method 4500H+ B-2011

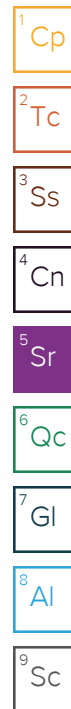
Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.41	T8	1	12/21/2019 21:00	WG1400533

Sample Narrative:

L1172918-01 WG1400533: 7.41 at 19C

Metals (ICPMS) by Method 200.8

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Aluminum	U		20.0	100	1	12/21/2019 18:33	WG1400655
Iron	U		15.0	100	1	12/21/2019 18:33	WG1400655
Lead	0.602	J	0.260	1.00	1	12/21/2019 18:33	WG1400655
Zinc	31.2		1.91	10.0	1	12/21/2019 18:33	WG1400655





Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	4500		350	2500	1	12/21/2019 21:00	WG1400986

1 Cp

2 Tc

3 Ss

4 Cn

Wet Chemistry by Method 1664A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
TPH - Oil & Grease	U		763	5260	1	12/27/2019 14:15	WG1402921

5 Sr

6 Qc

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.42	T8	1	12/21/2019 21:00	WG1400533

7 Gl

8 Al

Sample Narrative:

L1172918-02 WG1400533: 7.42 at 19.7C

Metals (ICPMS) by Method 200.8

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Aluminum	U		20.0	100	1	12/21/2019 18:36	WG1400655
Iron	20.4	J	15.0	100	1	12/21/2019 18:36	WG1400655
Lead	0.568	J	0.260	1.00	1	12/21/2019 18:36	WG1400655
Zinc	24.8		1.91	10.0	1	12/21/2019 18:36	WG1400655

9 Sc



Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	U		357	2550	1	12/21/2019 21:00	WG1400986

Sample Narrative:

L1172918-03 WG1400986: Reporting limit determined by filtrate volume.

Wet Chemistry by Method 1664A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
TPH - Oil & Grease	U		732	5050	1	12/27/2019 14:15	WG1402921

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	6.86	T8	1	12/21/2019 21:00	WG1400533

Sample Narrative:

L1172918-03 WG1400533: 6.86 at 19.4C

Metals (ICPMS) by Method 200.8

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Aluminum	U		20.0	100	1	12/21/2019 18:39	WG1400655
Iron	59.6	J	15.0	100	1	12/21/2019 18:39	WG1400655
Lead	1.55		0.260	1.00	1	12/21/2019 18:39	WG1400655
Zinc	54.9		1.91	10.0	1	12/21/2019 18:39	WG1400655

¹ Cp² Tc³ Ss⁴ Cn⁵ Sr⁶ Qc⁷ Gl⁸ Al⁹ Sc



Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	U		350	2500	1	12/21/2019 21:00	WG1400986

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Wet Chemistry by Method 1664A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
TPH - Oil & Grease	U		780	5380	1	12/27/2019 14:15	WG1402921

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.61	T8	1	12/21/2019 21:00	WG1400533

Sample Narrative:

L1172918-04 WG1400533: 7.61 at 19.5C

Metals (ICPMS) by Method 200.8

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Aluminum	U		20.0	100	1	12/21/2019 18:42	WG1400655
Iron	U		15.0	100	1	12/21/2019 18:42	WG1400655
Lead	0.426	J	0.260	1.00	1	12/21/2019 18:42	WG1400655
Zinc	19.3		1.91	10.0	1	12/21/2019 18:42	WG1400655



Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	U		350	2500	1	12/21/2019 21:00	WG1400986

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Wet Chemistry by Method 1664A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
TPH - Oil & Grease	U		780	5380	1	12/27/2019 14:15	WG1402921

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.67	T8	1	12/21/2019 21:00	WG1400533

Sample Narrative:

L1172918-05 WG1400533: 7.67 at 19.4C

Metals (ICPMS) by Method 200.8

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Aluminum	U		20.0	100	1	12/21/2019 18:46	WG1400655
Iron	U		15.0	100	1	12/21/2019 18:46	WG1400655
Lead	0.347	J	0.260	1.00	1	12/21/2019 18:46	WG1400655
Zinc	17.3		1.91	10.0	1	12/21/2019 18:46	WG1400655

Method Blank (MB)

(MB) R3484942-1 12/21/19 21:00

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	ug/l		ug/l	ug/l
Suspended Solids	U		350	2500

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc

L1173054-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1173054-01 12/21/19 21:00 • (DUP) R3484942-3 12/21/19 21:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	ug/l	ug/l		%		%
Suspended Solids	800000	950000	1	17.1	P1	5

L1173304-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1173304-02 12/21/19 21:00 • (DUP) R3484942-4 12/21/19 21:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	ug/l	ug/l		%		%
Suspended Solids	9000	11600	1	25.2	P1	5

Laboratory Control Sample (LCS)

(LCS) R3484942-2 12/21/19 21:00

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	ug/l	ug/l	%	%	
Suspended Solids	773000	800000	103	85.0-115	



Method Blank (MB)

(MB) R3486403-1 12/27/19 14:15

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
TPH - Oil & Grease	U		725	5000

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3486403-2 12/27/19 14:15 • (LCSD) R3486403-3 12/27/19 14:15

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
TPH - Oil & Grease	20000	15200	16300	76.0	81.5	64.0-132			6.98	34

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

L1172885-10 Original Sample (OS) • Duplicate (DUP)

(OS) L1172885-10 12/21/19 21:00 • (DUP) R3484881-2 12/21/19 21:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	6.94	6.95	1	0.144		1

Sample Narrative:
OS: 6.94 at 19.5C
DUP: 6.95 at 19.6C

1
Cp

2
Tc

3
Ss

4
Cn

5
Sr

6
Qc

7
Gl

8
Al

9
Sc

L1172929-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1172929-04 12/21/19 21:00 • (DUP) R3484881-3 12/21/19 21:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.74	7.75	1	0.129		1

Sample Narrative:
OS: 7.74 at 19.6C
DUP: 7.75 at 19.5C

Laboratory Control Sample (LCS)

(LCS) R3484881-1 12/21/19 21:00

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	su	su	%	%	
pH	10.0	10.0	100	99.0-101	

Sample Narrative:
LCS: 10.01 at 18.6C

Method Blank (MB)

(MB) R3485021-1 12/21/19 17:43

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Aluminum	U		20.0	100
Iron	U		15.0	100
Lead	U		0.260	1.00
Zinc	U		1.91	10.0

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3485021-2 12/21/19 17:47 • (LCSD) R3485021-3 12/21/19 17:50

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Aluminum	5000	4690	4610	93.8	92.1	85.0-115			1.78	20
Iron	5000	5010	5050	100	101	85.0-115			0.765	20
Lead	50.0	45.0	46.4	90.1	92.9	85.0-115			3.04	20
Zinc	50.0	48.1	48.8	96.3	97.5	85.0-115			1.28	20

L1172870-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1172870-01 12/21/19 17:53 • (MS) R3485021-5 12/21/19 18:00 • (MSD) R3485021-6 12/21/19 18:03

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum	5000	ND	4680	4800	92.8	95.1	1	70.0-130			2.37	20
Iron	5000	144	5210	5330	101	104	1	70.0-130			2.19	20
Lead	50.0	ND	51.7	47.1	103	94.2	1	70.0-130			9.23	20
Zinc	50.0	16.2	61.4	61.8	90.5	91.3	1	70.0-130			0.664	20

L1173213-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1173213-01 12/21/19 18:06 • (MS) R3485021-7 12/21/19 18:10 • (MSD) R3485021-8 12/21/19 18:13

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum	5000	ND	4660	4630	93.2	92.7	1	70.0-130			0.564	20
Iron	5000	ND	5170	5210	103	103	1	70.0-130			0.644	20
Lead	50.0	ND	47.1	46.5	94.2	93.0	1	70.0-130			1.22	20
Zinc	50.0	12.9	60.1	58.8	94.3	91.8	1	70.0-130			2.03	20



Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier Description

J	The identification of the analyte is acceptable; the reported value is an estimate.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
T8	Sample(s) received past/too close to holding time expiration.

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gi

8 Ai

9 Sc



Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey-NELAP	TN002
California	2932	New Mexico ¹	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio-VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1 6}	90010	South Carolina	84004
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1 4}	2006
Louisiana ¹	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

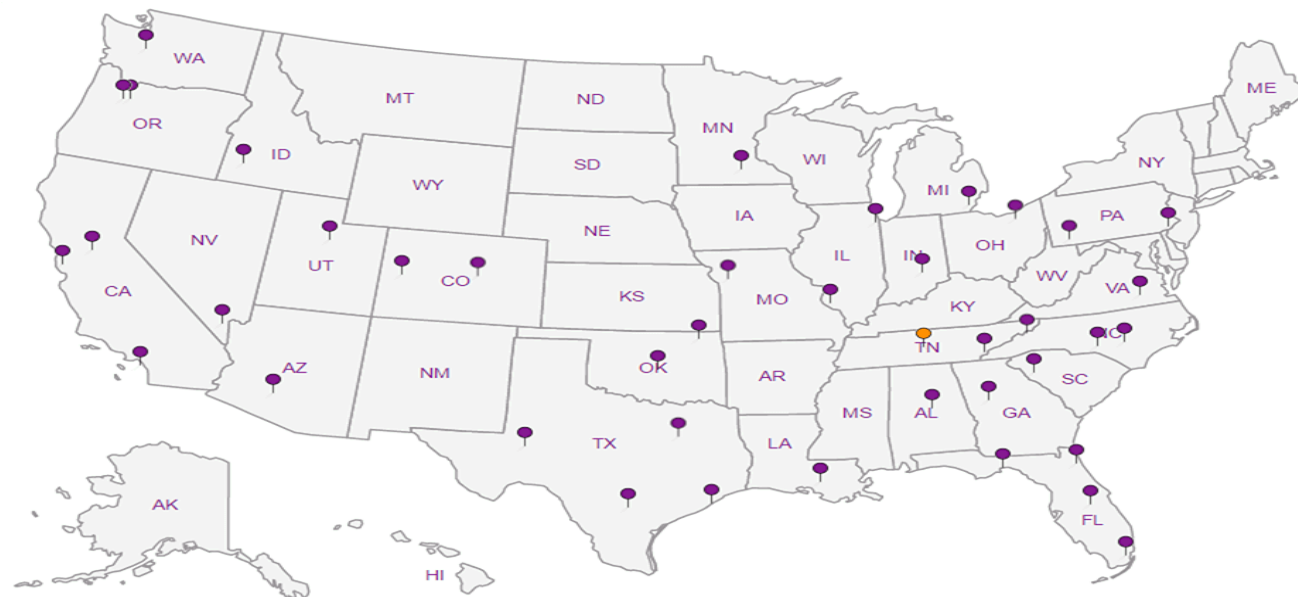
Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP, LLC EMLAP	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA-Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ⁶ Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.





Analysis Turnaroud Time	X Standard	<input type="checkbox"/> Other
-------------------------	------------	--------------------------------

GeoTracker EDF required? ☐ Yes ☒ No
 LOCUS EDD required? ☐ Yes ☒ No
 Report Results to: ☐ RL ☒ MDL
 Report soil results to: ☐ wet weight (total)

Specify analytic/prep method and detection limit in report.
Notify us of any anomalous peaks in GC or other scans.
Call immediately with any questions or problems.

ANALYSIS REQUESTED

COC Number:

Phone Number 415-498-0535

Sampled by:

Sample date(s):

PROJECT INFORMATION

Job Name: LRTC Industrial Stormwater


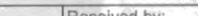
Job #:

Address: 402 Wright Avenue, Richmond CA 94804

[illegible]

Special Instructions/QC Requirements & Comments: Level II Report. Report with reporting limit and method detection limit. Analyze and report only the metals listed above.

RAD SCREEN: <0.5 mR/hr

Relinquished by: 	Company: CDIM	Date/Time: 12/18/19 1215	Received by: 	Company: None	Date/Time: 12-20-24 0930
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

x = Samples released to a secured, locked area.

● = Samples received from a secured, locked area


SAMPLERS NAME

SAMPLERS SIGNATURE _____

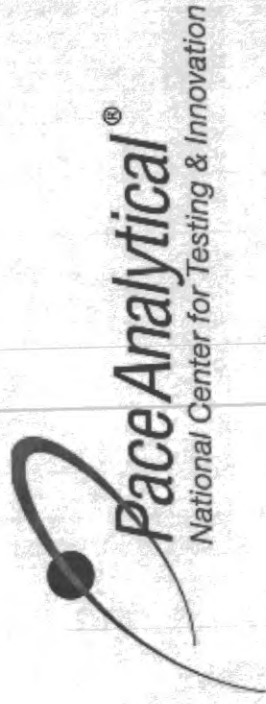
MOBILE #

DATE / TIME

Pace Analytical National Center for Testing & Innovation
Cooler Receipt Form

Client:			
Cooler Received/Opened On: 12 / 10 / 19	Temperature: .1		
Received By: Tanner Windham			
Signature: 			
Receipt Check List	NP	Yes	No
COC Seal Present / Intact?			
COC Signed / Accurate?			
Bottles arrive intact?			
Correct bottles used?			
Sufficient volume sent?			
If Applicable			
VOA Zero headspace?			
Preservation Correct / Checked?			

Kelsey Stephenson



Login #: L1172918	Client:CDIENGSCFA	Date:12/20	Evaluated by:Kelsey S
-------------------	-------------------	------------	-----------------------

Non-Conformance (check applicable items)

Sample Integrity	Chain of Custody Clarification	If Broken Container:
Parameter(s) past holding time	Login Clarification Needed	Insufficient packing material around container
Temperature not in range	Chain of custody is incomplete	Insufficient packing material inside cooler
Improper container type	Please specify Metals requested.	Improper handling by carrier (FedEx / UPS / Courier
pH not in range.	Please specify TCLP requested.	Sample was frozen
Insufficient sample volume.	Received additional samples not listed on coc.	Container lid not intact
Sample is biphasic.	Sample ids on containers do not match ids on coc	If no Chain of Custody:
Vials received with headspace.	Trip Blank not received.	Received by:
Broken container	Client did not "X" analysis.	Date/Time:
Broken container:	Chain of Custody is missing	Temp./Cont. Rec./pH:
Sufficient sample remains		Carrier:
		Tracking#

Login Comments: No additional volume received for TSX-E-191218

Client informed by:	Call	Email	Voice Mail	Date:	Time:
TSR Initials:bjf	Client Contact:				

Login Instructions

Proceed without MS/MSD study/comment

CDIM Engineering - San Francisco, CA

Sample Delivery Group: L1181012
Samples Received: 01/18/2020
Project Number:
Description: LRTC Industrial Stormwater
Site: 402 WRIGHT AVE RICHMOND CA
Report To: Bryan Starks
45 Polk Street
3rd Floor
San Francisco, CA 94102

Entire Report Reviewed By:



Jason Romer
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.





Cp: Cover Page	1
Tc: Table of Contents	2
Ss: Sample Summary	3
Cn: Case Narrative	4
Sr: Sample Results	5
TS1-I-200116 L1181012-01	5
TS2-I-200116 L1181012-02	6
TS3-I-200116 L1181012-03	7
TS4-I-200116 L1181012-04	8
Qc: Quality Control Summary	9
Gravimetric Analysis by Method 2540 D-2011	9
Wet Chemistry by Method 1664A	11
Wet Chemistry by Method 4500H+ B-2011	12
Metals (ICPMS) by Method 200.8	15
Gl: Glossary of Terms	17
Al: Accreditations & Locations	18
Sc: Sample Chain of Custody	19



SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



TS1-I-200116 L1181012-01 WW

Collected by
Bryan Starks

Collected date/time
01/16/20 10:03

Received date/time
01/18/20 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 D-2011	WG1413702	1	01/19/20 08:35	01/19/20 09:56	TH	Mt. Juliet, TN
Wet Chemistry by Method 1664A	WG1414938	1	01/21/20 18:30	01/22/20 09:59	AMG	Mt. Juliet, TN
Wet Chemistry by Method 4500H+ B-2011	WG1414224	1	01/21/20 09:01	01/21/20 09:01	EEM	Mt. Juliet, TN
Metals (ICPMS) by Method 200.8	WG1413726	1	01/24/20 08:17	01/24/20 16:49	JPD	Mt. Juliet, TN

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

TS2-I-200116 L1181012-02 WW

Collected by
Bryan Starks

Collected date/time
01/16/20 10:26

Received date/time
01/18/20 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 D-2011	WG1415496	1	01/22/20 19:55	01/22/20 21:07	MMF	Mt. Juliet, TN
Wet Chemistry by Method 1664A	WG1414938	1	01/21/20 18:30	01/22/20 09:59	AMG	Mt. Juliet, TN
Wet Chemistry by Method 4500H+ B-2011	WG1415340	1	01/23/20 12:00	01/23/20 12:00	MSP	Mt. Juliet, TN
Metals (ICPMS) by Method 200.8	WG1414761	1	01/23/20 07:24	01/23/20 15:15	JPD	Mt. Juliet, TN

TS3-I-200116 L1181012-03 WW

Collected by
Bryan Starks

Collected date/time
01/16/20 10:46

Received date/time
01/18/20 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 D-2011	WG1415496	1	01/22/20 19:55	01/22/20 21:07	MMF	Mt. Juliet, TN
Wet Chemistry by Method 1664A	WG1414938	1	01/21/20 18:30	01/22/20 09:59	AMG	Mt. Juliet, TN
Wet Chemistry by Method 4500H+ B-2011	WG1414860	1	01/22/20 14:00	01/22/20 14:00	JIC	Mt. Juliet, TN
Metals (ICPMS) by Method 200.8	WG1414761	1	01/23/20 07:24	01/23/20 15:19	JPD	Mt. Juliet, TN

TS4-I-200116 L1181012-04 WW

Collected by
Bryan Starks

Collected date/time
01/16/20 10:50

Received date/time
01/18/20 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 D-2011	WG1415496	1	01/22/20 19:55	01/22/20 21:07	MMF	Mt. Juliet, TN
Wet Chemistry by Method 1664A	WG1414938	1	01/21/20 18:30	01/22/20 09:59	AMG	Mt. Juliet, TN
Wet Chemistry by Method 4500H+ B-2011	WG1414860	1	01/22/20 14:00	01/22/20 14:00	JIC	Mt. Juliet, TN
Metals (ICPMS) by Method 200.8	WG1414761	1	01/23/20 07:24	01/23/20 15:22	JPD	Mt. Juliet, TN

ACCOUNT:

CDIM Engineering - San Francisco, CA

PROJECT:

SDG:

L1181012

DATE/TIME:

01/27/20 13:33

PAGE:

3 of 21



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Jason Romer
Project Manager

¹ Cp² Tc³ Ss⁴ Cn⁵ Sr⁶ Qc⁷ Gl⁸ Al⁹ Sc



Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	89000		3500	25000	1	01/19/2020 09:56	WG1413702

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Wet Chemistry by Method 1664A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
TPH - Oil & Grease	U		780	5380	1	01/22/2020 09:59	WG1414938

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.44	T8	1	01/21/2020 09:01	WG1414224

Sample Narrative:

L1181012-01 WG1414224: 7.44 at 18.2C

Metals (ICPMS) by Method 200.8

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Aluminum	1840		20.0	100	1	01/24/2020 16:49	WG1413726
Iron	3950		15.0	100	1	01/24/2020 16:49	WG1413726
Lead	37.2		0.260	1.00	1	01/24/2020 16:49	WG1413726
Zinc	313		1.91	10.0	1	01/24/2020 16:49	WG1413726



Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	136000		7000	50000	1	01/22/2020 21:07	WG1415496

1 Cp

2 Tc

3 Ss

4 Cn

Wet Chemistry by Method 1664A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
TPH - Oil & Grease	U		788	5440	1	01/22/2020 09:59	WG1414938

5 Sr

6 Qc

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.36	T8	1	01/23/2020 12:00	WG1415340

7 Gl

8 Al

Sample Narrative:

L1181012-02 WG1415340: 7.36 at 19C

Metals (ICPMS) by Method 200.8

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Aluminum	685		20.0	100	1	01/23/2020 15:15	WG1414761
Iron	2050		15.0	100	1	01/23/2020 15:15	WG1414761
Lead	19.0		0.260	1.00	1	01/23/2020 15:15	WG1414761
Zinc	149		1.91	10.0	1	01/23/2020 15:15	WG1414761

9 Sc



Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	11000		350	2500	1	01/22/2020 21:07	WG1415496

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Wet Chemistry by Method 1664A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
TPH - Oil & Grease	U		815	5620	1	01/22/2020 09:59	WG1414938

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.73	T8	1	01/22/2020 14:00	WG1414860

Sample Narrative:

L1181012-03 WG1414860: 7.73 at 17.8C

Metals (ICPMS) by Method 200.8

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Aluminum	337		20.0	100	1	01/23/2020 15:19	WG1414761
Iron	762		15.0	100	1	01/23/2020 15:19	WG1414761
Lead	45.3		0.260	1.00	1	01/23/2020 15:19	WG1414761
Zinc	91.6		1.91	10.0	1	01/23/2020 15:19	WG1414761



Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	34800		700	5000	1	01/22/2020 21:07	WG1415496

1 Cp

2 Tc

3 Ss

4 Cn

Wet Chemistry by Method 1664A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
TPH - Oil & Grease	U		788	5440	1	01/22/2020 09:59	WG1414938

5 Sr

6 Qc

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.63	T8	1	01/22/2020 14:00	WG1414860

7 Gl

8 Al

Sample Narrative:

L1181012-04 WG1414860: 7.63 at 17.8C

Metals (ICPMS) by Method 200.8

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Aluminum	871		20.0	100	1	01/23/2020 15:22	WG1414761
Iron	1500		15.0	100	1	01/23/2020 15:22	WG1414761
Lead	10.0		0.260	1.00	1	01/23/2020 15:22	WG1414761
Zinc	56.1		1.91	10.0	1	01/23/2020 15:22	WG1414761

9 Sc

Method Blank (MB)

(MB) R3492436-1 01/19/20 09:56

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	ug/l		ug/l	ug/l
Suspended Solids	U		350	2500

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc

L1180677-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1180677-01 01/19/20 09:56 • (DUP) R3492436-3 01/19/20 09:56

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	ug/l	ug/l		%		%
Suspended Solids	85000	87000	1	2.33		5

L1180906-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1180906-05 01/19/20 09:56 • (DUP) R3492436-4 01/19/20 09:56

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	ug/l	ug/l		%		%
Suspended Solids	46000	16000	1	96.8	J P1	5

Laboratory Control Sample (LCS)

(LCS) R3492436-2 01/19/20 09:56

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	ug/l	ug/l	%	%	
Suspended Solids	773000	844000	109	85.0-115	

Method Blank (MB)

(MB) R3493381-1 01/22/20 21:07

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	ug/l		ug/l	ug/l
Suspended Solids	U		350	2500

L1179827-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1179827-01 01/22/20 21:07 • (DUP) R3493381-3 01/22/20 21:07

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	ug/l	ug/l		%		%
Suspended Solids	175000	178000	1	1.70		5

L1181086-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1181086-02 01/22/20 21:07 • (DUP) R3493381-4 01/22/20 21:07

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	ug/l	ug/l		%		%
Suspended Solids	28200	30200	1	6.85	J3	5

Laboratory Control Sample (LCS)

(LCS) R3493381-2 01/22/20 21:07

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	ug/l	ug/l	%	%	
Suspended Solids	773000	756000	97.8	85.0-115	

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc



Method Blank (MB)

(MB) R3492930-1 01/22/20 09:59

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
TPH - Oil & Grease	U		725	5000

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3492930-2 01/22/20 09:59 • (LCSD) R3492930-3 01/22/20 09:59

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
TPH - Oil & Grease	20000	20900	19400	105	97.0	64.0-132			7.44	34

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L1180298-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1180298-01 01/21/20 09:01 • (DUP) R3492533-2 01/21/20 09:01

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.48	7.48	1	0.000		1

Sample Narrative:
OS: 7.48 at 18.3C
DUP: 7.48 at 18.3C

L1181025-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1181025-03 01/21/20 09:01 • (DUP) R3492533-3 01/21/20 09:01

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	6.81	6.82	1	0.147		1

Sample Narrative:
OS: 6.81 at 18.4C
DUP: 6.82 at 18.3C

Laboratory Control Sample (LCS)

(LCS) R3492533-1 01/21/20 09:01

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	su	su	%	%	
pH	10.0	10.0	100	99.0-101	

Sample Narrative:
LCS: 10.03 at 16.9C

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

L1181012-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1181012-03 01/22/20 14:00 • (DUP) R3493150-2 01/22/20 14:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.73	7.73	1	0.000		1

Sample Narrative:
OS: 7.73 at 17.8C
DUP: 7.73 at 17.5C

L1181513-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1181513-02 01/22/20 14:00 • (DUP) R3493150-3 01/22/20 14:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	6.81	6.82	1	0.147		1

Sample Narrative:
OS: 6.81 at 16C
DUP: 6.82 at 18.4C

Laboratory Control Sample (LCS)

(LCS) R3493150-1 01/22/20 14:00

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	su	su	%	%	
pH	10.0	10.0	100	99.0-101	

Sample Narrative:
LCS: 10.01 at 17.8C

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

L1177016-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1177016-01 01/23/20 12:00 • (DUP) R3493434-2 01/23/20 12:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	8.04	8.05	1	0.124		1

Sample Narrative:
OS: 8.04 at 18.7C
DUP: 8.05 at 18.7C

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L1181485-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1181485-02 01/23/20 12:00 • (DUP) R3493434-3 01/23/20 12:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	6.58	6.53	1	0.763		1

Sample Narrative:
OS: 6.58 at 20.9C
DUP: 6.53 at 19.7C

Laboratory Control Sample (LCS)

(LCS) R3493434-1 01/23/20 12:00

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	su	su	%	%	
pH	10.0	9.99	99.9	99.0-101	

Sample Narrative:
LCS: 9.99 at 18.4C



Method Blank (MB)

(MB) R3493931-1 01/24/20 15:38

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Aluminum	U		20.0	100
Iron	U		15.0	100
Lead	U		0.260	1.00
Zinc	U		1.91	10.0

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3493931-2 01/24/20 15:41 • (LCSD) R3493931-3 01/24/20 15:45

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Aluminum	5000	5120	5200	102	104	85.0-115			1.66	20
Iron	5000	5490	5430	110	109	85.0-115			1.10	20
Lead	50.0	46.4	50.1	92.8	100	85.0-115			7.72	20
Zinc	50.0	51.4	53.0	103	106	85.0-115			3.04	20

L1180944-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1180944-04 01/24/20 15:48 • (MS) R3493931-5 01/24/20 15:55 • (MSD) R3493931-6 01/24/20 15:59

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum	5000	ND	5160	5040	103	100	1	70.0-130			2.44	20
Iron	5000	ND	5510	5200	109	103	1	70.0-130			5.73	20
Lead	50.0	ND	48.3	49.9	96.5	99.7	1	70.0-130			3.25	20
Zinc	50.0	20.2	69.8	70.0	99.1	99.6	1	70.0-130			0.395	20

Method Blank (MB)

(MB) R3493530-1 01/23/20 14:35

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Aluminum	U		20.0	100
Iron	U		15.0	100
Lead	U		0.260	1.00
Zinc	U		1.91	10.0

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3493530-2 01/23/20 14:38 • (LCSD) R3493530-3 01/23/20 14:41

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Aluminum	5000	5080	5080	102	102	85.0-115			0.0645	20
Iron	5000	5280	5310	106	106	85.0-115			0.452	20
Lead	50.0	50.8	52.6	102	105	85.0-115			3.49	20
Zinc	50.0	53.2	54.4	106	109	85.0-115			2.38	20

L1181018-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1181018-05 01/23/20 14:45 • (MS) R3493530-5 01/23/20 14:51 • (MSD) R3493530-6 01/23/20 14:54

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum	5000	44.7	4980	4940	98.7	98.0	1	70.0-130			0.716	20
Iron	5000	16.6	5340	5260	107	105	1	70.0-130			1.65	20
Lead	50.0	0.471	52.2	51.5	104	102	1	70.0-130			1.41	20
Zinc	50.0	6.81	59.8	59.7	106	106	1	70.0-130			0.179	20

L1181832-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1181832-01 01/23/20 14:58 • (MS) R3493530-7 01/23/20 15:01 • (MSD) R3493530-8 01/23/20 15:04

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum	5000	155	5400	5130	105	99.6	1	70.0-130			5.00	20
Iron	5000	161	5580	5470	108	106	1	70.0-130			2.08	20
Lead	50.0	U	54.5	51.3	109	103	1	70.0-130			6.02	20
Zinc	50.0	9.09	62.5	61.4	107	105	1	70.0-130			1.81	20



Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier Description

J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
T8	Sample(s) received past/too close to holding time expiration.

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gi

8 Ai

9 Sc



Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico ¹	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1 6}	90010	South Carolina	84004
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1 4}	2006
Louisiana ¹	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

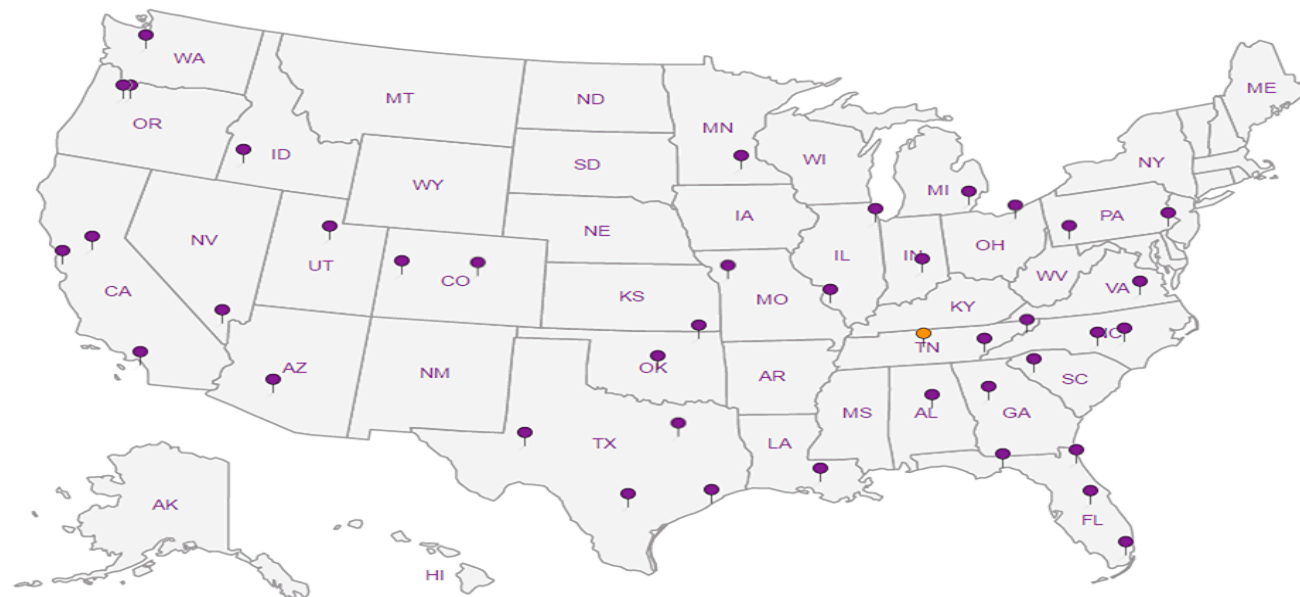
Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP, LLC EMLAP	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ⁶ Wastewater n/a Accreditation not applicable

Our Locations

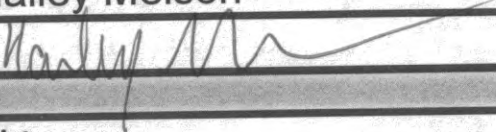
Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



D197

NCF

Pace Analytical National Center for Testing & Innovation
Cooler Receipt Form

Client: <u>CDIENG SFCA</u>		<u>L1181012</u>	
Cooler Received/Opened On: <u>1/18/20</u>		Temperature: <u>0.5</u>	
Received By: <u>Hailey Melson</u>			
Signature: 			
Receipt Check List	NP	Yes	No
COC Seal Present / Intact?	/		
COC Signed / Accurate?		/	
Bottles arrive intact?		/	
Correct bottles used?		/	
Sufficient volume sent?		/	
If Applicable			
VOA Zero headspace?			
Preservation Correct / Checked?		/	

Troy Dunlap



Login #: L1181012	Client: CDIENGSCFA	Date: 1/18/20	Evaluated by: Jeremy
-------------------	--------------------	---------------	----------------------

Non-Conformance (check applicable items)

Sample Integrity	Chain of Custody Clarification	If Broken Container:
Parameter(s) past holding time	<input checked="" type="checkbox"/> Login Clarification Needed	
Temperature not in range	Chain of custody is incomplete	Insufficient packing material around container
Improper container type	Please specify Metals requested.	Insufficient packing material inside cooler
pH not in range.	Please specify TCLP requested.	Improper handling by carrier (FedEx / UPS / Courier)
Insufficient sample volume.	Received additional samples not listed on coc.	Sample was frozen
Sample is biphasic.	Sample ids on containers do not match ids on coc	Container lid not intact
Vials received with headspace.	Trip Blank not received.	If no Chain of Custody:
Broken container	Client did not "X" analysis.	Received by:
Broken container:	Chain of Custody is missing	Date/Time:
Sufficient sample remains		Temp./Cont. Rec./pH:
		Carrier:
		Tracking#

Login Comments: Did not receive TS2, TS3, TS4 9 Deg C

Client informed by:	<input type="checkbox"/> Call x	<input type="checkbox"/> Email x	<input type="checkbox"/> Voice Mail	Date: 01/20/20	Time: 1145
TSR Initials: bjf	Client Contact: PMs				

Proceed with analysis

Notice: This communication and any attached files may contain privileged or other confidential information. If you have received this in error, please contact the sender immediately via reply email and immediately delete the message and any attachments without copying or disclosing the contents. Thank you.

January 27, 2020

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

CDIM Engineering - San Francisco, CA

Sample Delivery Group: L1181018
Samples Received: 01/18/2020
Project Number:
Description: LRTC Industrial Stormwater
Site: 402 WRIGHT AVE RICHMOND CA
Report To: Bryan Starks
45 Polk Street
3rd Floor
San Francisco, CA 94102

Entire Report Reviewed By:



Jason Romer
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.





Cp: Cover Page	1	¹ Cp
Tc: Table of Contents	2	
Ss: Sample Summary	3	² Tc
Cn: Case Narrative	4	
Sr: Sample Results	5	³ Ss
TS1-E-200116 L1181018-01	5	
TS2-E-200116 L1181018-02	6	⁴ Cn
TSX-E-200116 L1181018-03	7	⁵ Sr
TS3-E-200116 L1181018-04	8	
TS4-E-200116 L1181018-05	9	⁶ Qc
Qc: Quality Control Summary	10	⁷ Gl
Gravimetric Analysis by Method 2540 D-2011	10	
Wet Chemistry by Method 1664A	14	⁸ Al
Wet Chemistry by Method 4500H+ B-2011	15	
Metals (ICPMS) by Method 200.8	17	⁹ Sc
Gl: Glossary of Terms	19	
Al: Accreditations & Locations	20	
Sc: Sample Chain of Custody	21	

SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



TS1-E-200116 L1181018-01 WW

Collected by
Bryan Starks

Collected date/time
01/16/20 10:00

Received date/time
01/18/20 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 D-2011	WG1413702	1	01/19/20 08:35	01/19/20 09:56	TH	Mt. Juliet, TN
Wet Chemistry by Method 1664A	WG1414938	1	01/21/20 18:30	01/22/20 09:59	AMG	Mt. Juliet, TN
Wet Chemistry by Method 4500H+ B-2011	WG1414224	1	01/21/20 09:01	01/21/20 09:01	EEM	Mt. Juliet, TN
Metals (ICPMS) by Method 200.8	WG1413726	1	01/24/20 08:17	01/24/20 16:53	JPD	Mt. Juliet, TN

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

TS2-E-200116 L1181018-02 WW

Collected by
Bryan Starks

Collected date/time
01/16/20 10:20

Received date/time
01/18/20 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 D-2011	WG1413984	1	01/20/20 09:55	01/20/20 10:23	TH	Mt. Juliet, TN
Wet Chemistry by Method 1664A	WG1414938	1	01/21/20 18:30	01/22/20 09:59	AMG	Mt. Juliet, TN
Wet Chemistry by Method 4500H+ B-2011	WG1414224	1	01/21/20 09:01	01/21/20 09:01	EEM	Mt. Juliet, TN
Metals (ICPMS) by Method 200.8	WG1413726	1	01/24/20 08:17	01/24/20 17:04	JPD	Mt. Juliet, TN

TSX-E-200116 L1181018-03 WW

Collected by
Bryan Starks

Collected date/time
01/16/20 10:20

Received date/time
01/18/20 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 D-2011	WG1413984	1	01/20/20 09:55	01/20/20 10:23	TH	Mt. Juliet, TN
Wet Chemistry by Method 1664A	WG1414938	1	01/21/20 18:30	01/22/20 09:59	AMG	Mt. Juliet, TN
Wet Chemistry by Method 4500H+ B-2011	WG1414224	1	01/21/20 09:01	01/21/20 09:01	EEM	Mt. Juliet, TN
Metals (ICPMS) by Method 200.8	WG1413726	1	01/24/20 08:17	01/24/20 17:07	JPD	Mt. Juliet, TN

TS3-E-200116 L1181018-04 WW

Collected by
Bryan Starks

Collected date/time
01/16/20 10:49

Received date/time
01/18/20 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 D-2011	WG1415496	1	01/22/20 19:55	01/22/20 21:07	MMF	Mt. Juliet, TN
Wet Chemistry by Method 1664A	WG1414938	1	01/21/20 18:30	01/22/20 09:59	AMG	Mt. Juliet, TN
Wet Chemistry by Method 4500H+ B-2011	WG1414860	1	01/22/20 14:00	01/22/20 14:00	JIC	Mt. Juliet, TN
Metals (ICPMS) by Method 200.8	WG1414761	1	01/23/20 07:24	01/23/20 15:25	JPD	Mt. Juliet, TN

TS4-E-200116 L1181018-05 WW

Collected by
Bryan Starks

Collected date/time
01/16/20 10:57

Received date/time
01/18/20 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 D-2011	WG1415502	1	01/22/20 22:34	01/23/20 00:36	MMF	Mt. Juliet, TN
Wet Chemistry by Method 1664A	WG1414938	1	01/21/20 18:30	01/22/20 09:59	AMG	Mt. Juliet, TN
Wet Chemistry by Method 4500H+ B-2011	WG1414860	1	01/22/20 14:00	01/22/20 14:00	JIC	Mt. Juliet, TN
Metals (ICPMS) by Method 200.8	WG1414761	1	01/23/20 07:24	01/23/20 14:45	JPD	Mt. Juliet, TN

ACCOUNT:

CDIM Engineering - San Francisco, CA

PROJECT:

SDG:

L1181018

DATE/TIME:

01/27/20 13:35

PAGE:

3 of 23



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Jason Romer
Project Manager

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	73000		3500	25000	1	01/19/2020 09:56	WG1413702

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Wet Chemistry by Method 1664A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
TPH - Oil & Grease	U		806	5560	1	01/22/2020 09:59	WG1414938

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.57	T8	1	01/21/2020 09:01	WG1414224

Sample Narrative:

L1181018-01 WG1414224: 7.57 at 18.4C

Metals (ICPMS) by Method 200.8

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Aluminum	739		20.0	100	1	01/24/2020 16:53	WG1413726
Iron	1350		15.0	100	1	01/24/2020 16:53	WG1413726
Lead	17.3		0.260	1.00	1	01/24/2020 16:53	WG1413726
Zinc	139		1.91	10.0	1	01/24/2020 16:53	WG1413726



Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	28800		875	6250	1	01/20/2020 10:23	WG1413984

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Wet Chemistry by Method 1664A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
TPH - Oil & Grease	U		797	5490	1	01/22/2020 09:59	WG1414938

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.52	T8	1	01/21/2020 09:01	WG1414224

Sample Narrative:

L1181018-02 WG1414224: 7.52 at 18.5C

Metals (ICPMS) by Method 200.8

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Aluminum	103		20.0	100	1	01/24/2020 17:04	WG1413726
Iron	300		15.0	100	1	01/24/2020 17:04	WG1413726
Lead	2.88		0.260	1.00	1	01/24/2020 17:04	WG1413726
Zinc	44.1		1.91	10.0	1	01/24/2020 17:04	WG1413726



Gravimetric Analysis by Method 2540 D-2011

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Suspended Solids	28600		539	3850	1	01/20/2020 10:23	WG1413984

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Wet Chemistry by Method 1664A

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
TPH - Oil & Grease	U		797	5490	1	01/22/2020 09:59	WG1414938

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	7.54	T8	1	01/21/2020 09:01	WG1414224

Sample Narrative:

L1181018-03 WG1414224: 7.54 at 18.4C

Metals (ICPMS) by Method 200.8

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Aluminum	96.6	J	20.0	100	1	01/24/2020 17:07	WG1413726
Iron	307		15.0	100	1	01/24/2020 17:07	WG1413726
Lead	2.78		0.260	1.00	1	01/24/2020 17:07	WG1413726
Zinc	43.4		1.91	10.0	1	01/24/2020 17:07	WG1413726



Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	1220	J	357	2550	1	01/22/2020 21:07	WG1415496

Sample Narrative:

L1181018-04 WG1415496: Reporting limit determined by filtrate volume.

Wet Chemistry by Method 1664A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
TPH - Oil & Grease	U		788	5440	1	01/22/2020 09:59	WG1414938

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.16	T8	1	01/22/2020 14:00	WG1414860

Sample Narrative:

L1181018-04 WG1414860: 7.16 at 17.1C

Metals (ICPMS) by Method 200.8

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Aluminum	U		20.0	100	1	01/23/2020 15:25	WG1414761
Iron	142		15.0	100	1	01/23/2020 15:25	WG1414761
Lead	2.84		0.260	1.00	1	01/23/2020 15:25	WG1414761
Zinc	57.8		1.91	10.0	1	01/23/2020 15:25	WG1414761

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc



Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	830	J	364	2600	1	01/23/2020 00:36	WG1415502

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Wet Chemistry by Method 1664A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
TPH - Oil & Grease	U		806	5560	1	01/22/2020 09:59	WG1414938

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.33	T8	1	01/22/2020 14:00	WG1414860

Sample Narrative:

L1181018-05 WG1414860: 8.33 at 16.7C

Metals (ICPMS) by Method 200.8

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Aluminum	44.7	J	20.0	100	1	01/23/2020 14:45	WG1414761
Iron	16.6	J	15.0	100	1	01/23/2020 14:45	WG1414761
Lead	0.471	J	0.260	1.00	1	01/23/2020 14:45	WG1414761
Zinc	6.81	J	1.91	10.0	1	01/23/2020 14:45	WG1414761

Method Blank (MB)

(MB) R3492436-1 01/19/20 09:56

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	ug/l		ug/l	ug/l
Suspended Solids	U		350	2500

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc

L1180677-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1180677-01 01/19/20 09:56 • (DUP) R3492436-3 01/19/20 09:56

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	ug/l	ug/l		%		%
Suspended Solids	85000	87000	1	2.33		5

L1180906-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1180906-05 01/19/20 09:56 • (DUP) R3492436-4 01/19/20 09:56

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	ug/l	ug/l		%		%
Suspended Solids	46000	16000	1	96.8	J P1	5

Laboratory Control Sample (LCS)

(LCS) R3492436-2 01/19/20 09:56

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	ug/l	ug/l	%	%	
Suspended Solids	773000	844000	109	85.0-115	

Method Blank (MB)

(MB) R3492445-1 01/20/20 10:23

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	ug/l		ug/l	ug/l
Suspended Solids	U		350	2500

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc

L1181018-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1181018-02 01/20/20 10:23 • (DUP) R3492445-3 01/20/20 10:23

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	ug/l	ug/l		%		%
Suspended Solids	28800	29000	1	0.866		5

Laboratory Control Sample (LCS)

(LCS) R3492445-2 01/20/20 10:23

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	ug/l	ug/l	%	%	
Suspended Solids	773000	820000	106	85.0-115	

Method Blank (MB)

(MB) R3493381-1 01/22/20 21:07

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	ug/l		ug/l	ug/l
Suspended Solids	U		350	2500

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc

L1179827-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1179827-01 01/22/20 21:07 • (DUP) R3493381-3 01/22/20 21:07

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	ug/l	ug/l		%		%
Suspended Solids	175000	178000	1	1.70		5

L1181086-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1181086-02 01/22/20 21:07 • (DUP) R3493381-4 01/22/20 21:07

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	ug/l	ug/l		%		%
Suspended Solids	28200	30200	1	6.85	J3	5

Laboratory Control Sample (LCS)

(LCS) R3493381-2 01/22/20 21:07

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	ug/l	ug/l	%	%	
Suspended Solids	773000	756000	97.8	85.0-115	

Method Blank (MB)

(MB) R3493801-1 01/23/20 00:36

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	ug/l		ug/l	ug/l
Suspended Solids	U		350	2500

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc

L1181025-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1181025-01 01/23/20 00:36 • (DUP) R3493801-3 01/23/20 00:36

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	ug/l	ug/l		%		%
Suspended Solids	86400	92800	1	7.14	J3	5

Laboratory Control Sample (LCS)

(LCS) R3493801-2 01/23/20 00:36

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	ug/l	ug/l	%	%	
Suspended Solids	773000	768000	99.4	85.0-115	



Method Blank (MB)

(MB) R3492930-1 01/22/20 09:59

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
TPH - Oil & Grease	U		725	5000

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3492930-2 01/22/20 09:59 • (LCSD) R3492930-3 01/22/20 09:59

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
TPH - Oil & Grease	20000	20900	19400	105	97.0	64.0-132			7.44	34

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

L1180298-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1180298-01 01/21/20 09:01 • (DUP) R3492533-2 01/21/20 09:01

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.48	7.48	1	0.000		1

Sample Narrative:
OS: 7.48 at 18.3C
DUP: 7.48 at 18.3C

L1181025-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1181025-03 01/21/20 09:01 • (DUP) R3492533-3 01/21/20 09:01

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	6.81	6.82	1	0.147		1

Sample Narrative:
OS: 6.81 at 18.4C
DUP: 6.82 at 18.3C

Laboratory Control Sample (LCS)

(LCS) R3492533-1 01/21/20 09:01

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	su	su	%	%	
pH	10.0	10.0	100	99.0-101	

Sample Narrative:
LCS: 10.03 at 16.9C

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

L1181012-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1181012-03 01/22/20 14:00 • (DUP) R3493150-2 01/22/20 14:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.73	7.73	1	0.000		1

Sample Narrative:
OS: 7.73 at 17.8C
DUP: 7.73 at 17.5C

L1181513-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1181513-02 01/22/20 14:00 • (DUP) R3493150-3 01/22/20 14:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	6.81	6.82	1	0.147		1

Sample Narrative:
OS: 6.81 at 16C
DUP: 6.82 at 18.4C

Laboratory Control Sample (LCS)

(LCS) R3493150-1 01/22/20 14:00

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	su	su	%	%	
pH	10.0	10.0	100	99.0-101	

Sample Narrative:
LCS: 10.01 at 17.8C

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R3493931-1 01/24/20 15:38

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Aluminum	U		20.0	100
Iron	U		15.0	100
Lead	U		0.260	1.00
Zinc	U		1.91	10.0

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3493931-2 01/24/20 15:41 • (LCSD) R3493931-3 01/24/20 15:45

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Aluminum	5000	5120	5200	102	104	85.0-115			1.66	20
Iron	5000	5490	5430	110	109	85.0-115			1.10	20
Lead	50.0	46.4	50.1	92.8	100	85.0-115			7.72	20
Zinc	50.0	51.4	53.0	103	106	85.0-115			3.04	20

L1180944-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1180944-04 01/24/20 15:48 • (MS) R3493931-5 01/24/20 15:55 • (MSD) R3493931-6 01/24/20 15:59

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum	5000	ND	5160	5040	103	100	1	70.0-130			2.44	20
Iron	5000	ND	5510	5200	109	103	1	70.0-130			5.73	20
Lead	50.0	ND	48.3	49.9	96.5	99.7	1	70.0-130			3.25	20
Zinc	50.0	20.2	69.8	70.0	99.1	99.6	1	70.0-130			0.395	20



Method Blank (MB)

(MB) R3493530-1 01/23/20 14:35

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Aluminum	U		20.0	100
Iron	U		15.0	100
Lead	U		0.260	1.00
Zinc	U		1.91	10.0

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3493530-2 01/23/20 14:38 • (LCSD) R3493530-3 01/23/20 14:41

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Aluminum	5000	5080	5080	102	102	85.0-115			0.0645	20
Iron	5000	5280	5310	106	106	85.0-115			0.452	20
Lead	50.0	50.8	52.6	102	105	85.0-115			3.49	20
Zinc	50.0	53.2	54.4	106	109	85.0-115			2.38	20

L1181018-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1181018-05 01/23/20 14:45 • (MS) R3493530-5 01/23/20 14:51 • (MSD) R3493530-6 01/23/20 14:54

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum	5000	44.7	4980	4940	98.7	98.0	1	70.0-130			0.716	20
Iron	5000	16.6	5340	5260	107	105	1	70.0-130			1.65	20
Lead	50.0	0.471	52.2	51.5	104	102	1	70.0-130			1.41	20
Zinc	50.0	6.81	59.8	59.7	106	106	1	70.0-130			0.179	20

L1181832-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1181832-01 01/23/20 14:58 • (MS) R3493530-7 01/23/20 15:01 • (MSD) R3493530-8 01/23/20 15:04

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum	5000	155	5400	5130	105	99.6	1	70.0-130			5.00	20
Iron	5000	161	5580	5470	108	106	1	70.0-130			2.08	20
Lead	50.0	U	54.5	51.3	109	103	1	70.0-130			6.02	20
Zinc	50.0	9.09	62.5	61.4	107	105	1	70.0-130			1.81	20



Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier Description

J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
T8	Sample(s) received past/too close to holding time expiration.

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gi

8 Ai

9 Sc



Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico ¹	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1 6}	90010	South Carolina	84004
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1 4}	2006
Louisiana ¹	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

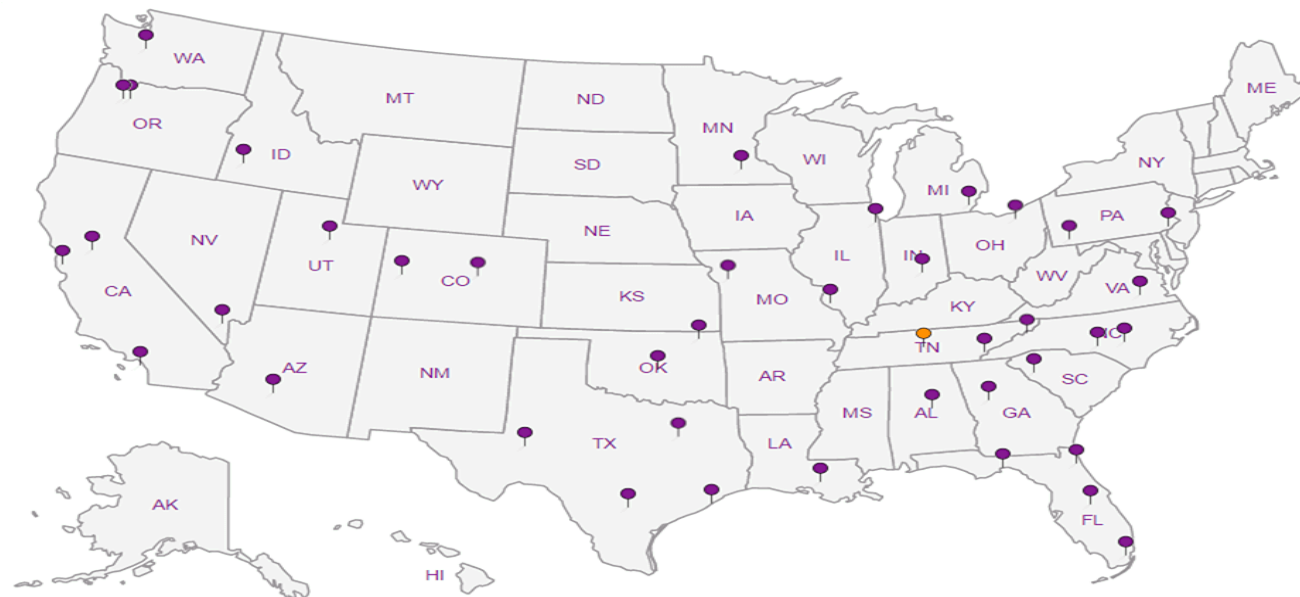
Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP, LLC EMLAP	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ⁶ Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



D196

LABORATORY:

INSTRUCTIONS FOR LAB PERSONNEL:

Analysis Turnaroud Time	X Standard	<input type="checkbox"/> Other
-------------------------	------------	--------------------------------

Specify analytic/prep method and detection limit in report.

CDIM CONTACT:





Project Manager: Bryan Starks

PROJECT INFORMATION

ANALYSIS REQUESTED

[illegible]

Special Instructions/QC Requirements & Comments: Level II Report. Report with reporting limit and method detection limit. Analyze and report only the metals listed above.

Relinquished by: 	<input type="checkbox"/> Company: CDIM	Date/Time: 1/16/2017 00	Received by:  <input type="radio"/>	Company: PACE	Date/Time: 1/18/2020 900
Relinquished by: 	<input type="checkbox"/> Company:	Date/Time:	Received by: <input type="radio"/>	Company:	Date/Time:
Relinquished by: 	<input type="checkbox"/> Company:	Date/Time:	Received by: <input type="radio"/>	Company:	Date/Time:

x = Samples released to a secured, locked area.

● = Samples received from a secured, locked area


SAMPLERS NAME Bryan Staudes

SAMPLERS SIGNATURE [Signature]

MOBILE #	808 256-9230
DATE / TIME	1/16/20 1300

RAD SCREEN: <0.5 mR/hr

Pace Analytical National Center for Testing & Innovation
Cooler Receipt Form

Client:	CDJENGSCA	21181018	
Cooler Received/Opened On:	1/8/20	Temperature: 0.5	
Received By: Hailey Melson			
Signature: 			
Receipt Check List	NP	Yes	No
COC Seal Present / Intact?	/	/	
COC Signed / Accurate?		/	
Bottles arrive intact?		/	
Correct bottles used?		/	
Sufficient volume sent?			
If Applicable			
VOA Zero headspace?		/	
Preservation Correct / Checked?			



Login #: L1181018	Client: CDIENGSCFA	Date: 1/18/20	Evaluated by: Jeremy
--------------------------	---------------------------	----------------------	-----------------------------

Non-Conformance (check applicable items)

Sample Integrity	Chain of Custody Clarification	If Broken Container:
Parameter(s) past holding time <input checked="" type="checkbox"/>	Login Clarification Needed	
Temperature not in range	Chain of custody is incomplete	Insufficient packing material around container
Improper container type	Please specify Metals requested.	Insufficient packing material inside cooler
pH not in range.	Please specify TCLP requested.	Improper handling by carrier (FedEx / UPS / Courier)
Insufficient sample volume.	Received additional samples not listed on coc.	Sample was frozen
Sample is biphasic.	Sample ids on containers do not match ids on coc	Container lid not intact
Vials received with headspace.	Trip Blank not received.	If no Chain of Custody:
Broken container	Client did not "X" analysis.	Received by:
Broken container:	Chain of Custody is missing	Date/Time:
Sufficient sample remains		Temp./Cont. Rec./pH:
		Carrier:
		Tracking#

Login Comments: TS3 and TS4 9 Deg C. Did not receive Additional volume for TSX-E-200116 for MS/MSD.

Client informed by:	<input type="checkbox"/> Call x	<input type="checkbox"/> Email x	<input type="checkbox"/> Voice Mail	<input type="checkbox"/> Date:01/20/20	<input type="checkbox"/> Time:1145
TSR Initials: bjf	Client Contact:PMs				

Proceed with analysis. For TSX-E, proceed without MS/MSD study.



APPENDIX C

Upland Capping System Inspection Form

Former United Heckathorn Superfund Site Upland Capping System Inspection Form
Levin Richmond Terminal, 402 Wright Avenue, Richmond, California

I. General Information

Site:	Former United Heckathorn Superfund Site, Levin Richmond Terminal	Inspector:	Bryan Starks and Scott Bourne
Address:	402 Wright Avenue, Richmond, CA	Organization:	CDIM
		Date and time of inspection:	5/29/2020 1100

II. Upland Area Concrete Cap, Gravel Cover, and Drainage System Observations

Note significant cracks, holes, penetrations, damage, settlement, or any exposure of underlying soil in any component of the capping system.

North Main Terminal (SW-3)

Yes No N/A Comments

Are concrete cap surfaces in adequate condition to promote effectiveness of the cap?

☒ ☐ ☐

Are gravel cover surfaces in adequate condition to promote effectiveness of the cap?

☒ ☐ ☐

Is storm water drainage infrastructure (interceptors, drain inlets) in adequate condition to prevent exposure of underlying soil to runoff?

☒ ☐ ☐

Is accumulated sediment observed in the interceptors or drain inlets?
If yes, note location and photograph.

☐ ☒ ☐

Are corrective actions required?

☐ ☒ ☐

Attach a photograph of areas requiring corrective action.

☐ ☐ ☒

Describe any recent repairs/maintenance:

Concrete cap repaired west of SW-3. Additionally a storm water drain inlet was installed adjacent to west side of SW-3 interceptor to remove a low spot in the area where water previously accumulated. Piping was installed to discharge drain inlet into opposite side of interceptor (east side) to allow higher retention time to increase settlement of sediment prior to discharge to Treatment System 2.

Drain inlets equipped with drain inlet filters. Drain inlet protection is inspected regularly and replaced as needed.

Cap generally appeared in good condition with typical surficial cracking and seams evident. No threat of exposure of underlying soils observed.

Describe conditions and locations of the capping system which require attention:

Continue to monitor cracks and seams.

Describe corrective actions required and their date(s) of implementation:

None.

Inspector Signature:



Date: 5/29/2020

Former United Heckathorn Superfund Site Upland Capping System Inspection Form
Levin Richmond Terminal, 402 Wright Avenue, Richmond, California

North Main Terminal/United Heckathorn (SW-4)

Yes No N/A Comments

Are concrete cap surfaces in adequate condition to promote effectiveness of the cap?

☒ ☐ ☐

Are gravel cover surfaces in adequate condition to promote effectiveness of the cap?

☒ ☐ ☐

Is storm water drainage infrastructure (interceptors, drain inlets) in adequate condition to prevent exposure of underlying soil to runoff?

☒ ☐ ☐

Is accumulated sediment observed in the interceptors or drain inlets?
If yes, note location and photograph.

☐ ☒ ☐

Are corrective actions required?

☐ ☒ ☐

Attach a photograph of areas requiring corrective action.

☐ ☐ ☒

Describe any recent repairs/maintenance:

None.

Describe conditions and locations of the capping system which require attention:

Drain inlets equipped with drain inlet filters. Drain inlet protection is inspected regularly and replaced as needed.

Cap generally appeared in good condition with typical surficial cracking and seams evident. No threat of exposure of underlying soils observed.

Describe corrective actions required and their date(s) of implementation:

Continue to monitor cracks and seams.



Former United Heckathorn Superfund Site Upland Capping System Inspection Form
Levin Richmond Terminal, 402 Wright Avenue, Richmond, California

North Main Terminal/United Heckathorn (SW-5)

Yes No N/A Comments

Are concrete cap surfaces in adequate condition to promote effectiveness of the cap?

☒ ☐ ☐

Are gravel cover surfaces in adequate condition to promote effectiveness of the cap?

☒ ☐ ☐

Is storm water drainage infrastructure (interceptors, drain inlets) in adequate condition to prevent exposure of underlying soil to runoff?

☒ ☐ ☐

Is accumulated sediment observed in the interceptors or drain inlets?
If yes, note location and photograph.

☐ ☒ ☐

Are corrective actions required?

☐ ☒ ☐

Attach a photograph of areas requiring corrective action.

☐ ☐ ☒

Describe any recent repairs/maintenance:

None.

Describe conditions and locations of the capping system which require attention:

Drain inlets equipped with drain inlet filters. Drain inlet protection is inspected regularly and replaced as needed.

Cap generally appeared in good condition with typical surficial cracking and seams evident. Sufficient gravel. No threat of exposure of underlying soils observed.

Describe corrective actions required and their date(s) of implementation:

Continue to monitor cracks and seams.

Gravel cover should continue to be monitored, and additional gravel placed as needed.



Former United Heckathorn Superfund Site Upland Capping System Inspection Form
Levin Richmond Terminal, 402 Wright Avenue, Richmond, California

North Main Terminal/United Heckathorn (SW-6)

Yes No N/A Comments

Are concrete cap surfaces in adequate condition to promote effectiveness of the cap?

☒ ☐ ☐

Are gravel cover surfaces in adequate condition to promote effectiveness of the cap?

☒ ☐ ☐

Is storm water drainage infrastructure (interceptors, drain inlets) in adequate condition to prevent exposure of underlying soil to runoff?

☒ ☐ ☐

Is accumulated sediment observed in the interceptors or drain inlets? If yes, note location and photograph.

☐ ☒ ☐

Are corrective actions required?

☒ ☐ ☐

Reinspection on 6/8 (see below)

Attach a photograph of areas requiring corrective action.

☐ ☒ ☐

Describe any recent repairs/maintenance:

None.

Describe conditions and locations of the capping system which require attention:

Tidal wash or possibly seepage observed at base of pile (approximately 0.5 ft. MLLW) adjacent to City of Richmond outfall at back of Lauritzen Channel.

Cap generally appeared in good condition with typical surficial cracking and seams evident. Sufficient gravel. No threat of exposure of underlying soils observed.

Describe corrective actions required and their date(s) of implementation:

CDIM will reinspect the area during extreme low tide on Monday, 6/8 (-1.3 at 8:39AM).

Continue to monitor cracks and seams.

Gravel cover should continue to be monitored, and additional gravel placed as needed.

Inspector Signature:



Date: 5/29/2020

Former United Heckathorn Superfund Site Upland Capping System Inspection Form
Levin Richmond Terminal, 402 Wright Avenue, Richmond, California

North Main Terminal/United Heckathorn (SW-7)

Yes No N/A Comments

Are concrete cap surfaces in adequate condition to promote effectiveness of the cap?

☒ ☐ ☐

Are gravel cover surfaces in adequate condition to promote effectiveness of the cap?

☒ ☐ ☐

Is storm water drainage infrastructure (interceptors, drain inlets) in adequate condition to prevent exposure of underlying soil to runoff?

☒ ☐ ☐

Is accumulated sediment observed in the interceptors or drain inlets?
If yes, note location and photograph.

☐ ☒ ☐

Are corrective actions required?

☐ ☒ ☐

Attach a photograph of areas requiring corrective action.

☐ ☐ ☒

Describe any recent repairs/maintenance:

None.

Describe conditions and locations of the capping system which require attention:

Cap generally appeared in good condition with typical surficial cracking and seams evident. Sufficient gravel. No threat of exposure of underlying soils observed.

Describe corrective actions required and their date(s) of implementation:

Continue to monitor cracks and seams.

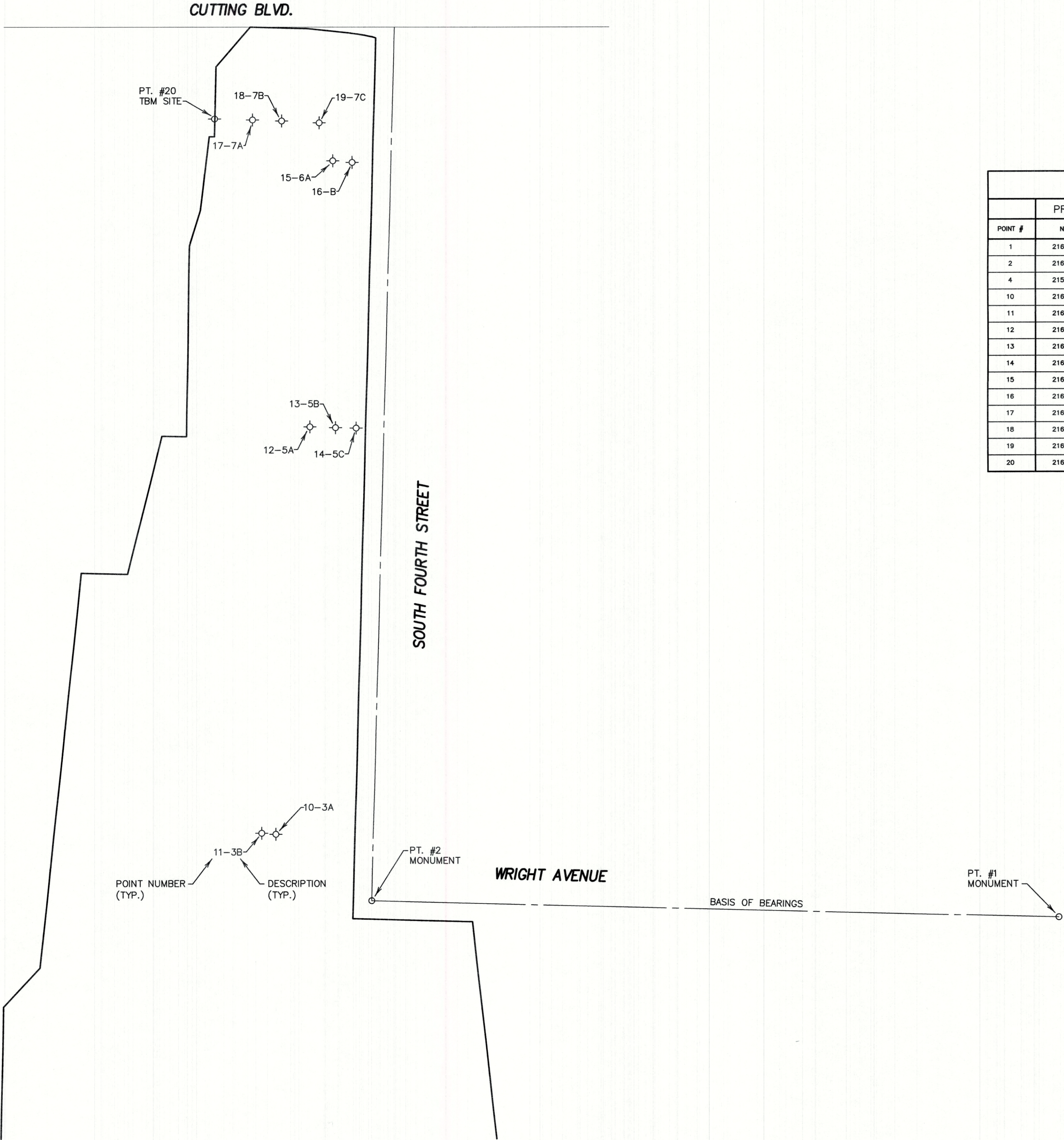
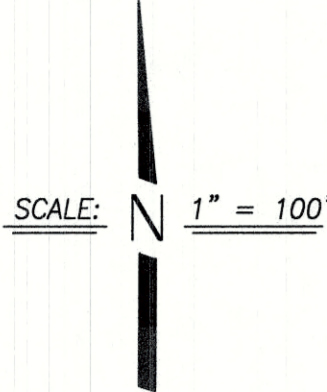
Gravel cover should continue to be monitored, and additional gravel placed as needed.





APPENDIX D

Upland Cap Survey Plat



POINT TABLE										
POINT #	PREVIOUS SURVEY (BY OTHERS)			SURVEY: MAY 9, 2017			SURVEY: APRIL 16, 2020			DESCRIPTION
	NORTHING	EASTING	ELEVATION	NORTHING	EASTING	ELEVATION	NORTHING	EASTING	ELEVATION	
1	2163237.6800	6024596.4500		2163237.6800	6024596.4500		2163237.6800	6024596.4500		MONUMENT
2	2163265.8500	6023475.4900		2163265.8500	6023475.4900		2163265.8500	6023475.4900		MONUMENT
4	2159762.3530	6025316.9420	15.164	-	-	-	-	-	-	TBM
10	2163374.0390	6023319.3450	12.900	2163373.9523	6023319.3392	12.90	2163374.0310	6023319.3430	12.86	3A
11	2163375.5790	6023296.1160	13.010	-	-	13.01	2163375.5358	6023296.0975	12.99	3B
12	2164037.4320	6023374.6750	13.229	2164037.3606	6023374.5955	13.22	2164037.4407	6023374.6909	13.23	5A
13	2164036.1170	6023416.5070	13.160	2164036.0760	6023416.4014	13.16	2164036.1543	6023416.4733	13.16	5B
14	2164035.3860	6023450.0640	12.270	2164035.3260	6023450.0066	12.27	2164035.3756	6023450.0572	12.27	5C
15	2164470.1450	6023411.8380	11.550	2164470.1234	6023411.7101	11.55	2164470.1247	6023411.8330	11.55	6A
16	2164467.3940	6023443.1740	10.890	2164467.4160	6023443.1350	10.89	2164467.3840	6023443.1903	10.88	6B
17	2164536.6770	6023281.0150	12.200	2164536.6437	6023280.8983	12.20	2164536.6518	6023281.0001	12.20	7A
18	2164535.0830	6023328.3880	13.605	2164535.0237	6023328.2973	13.61	2164535.0669	6023328.3980	13.61	7B
19	2164531.9560	6023389.6420	13.500	2164531.9398	6023389.5164	13.50	2164531.9753	6023389.6385	13.50	7C
20	2164538.2420	6023219.0670	11.532	2164538.2420	6023219.0670	11.53	2164538.2420	6023219.0670	11.53	TBM SITE

NOTES:

1. ORIGINAL BASIS OF BEARINGS AND ELEVATION (DONE BY OTHERS): HORIZONTAL CONTROL IS BASED ON A MODIFIED CALIFORNIA COORDINATE SYSTEM. THE BASIS OF BEARING FOR THIS MAP IS BETWEEN TWO BRASS DISKS WITHIN STANDARD CITY MONUMENT WELLS LOCATED AT THE INTERSECTIONS OF WRIGHT AVENUE WITH SOUTH 4TH STREET AND SOUTH 8TH STREET. THE COORDINATE VALUES AT SOUTH 4TH STREET = NORTHING 2163265.8500, EASTING 6023475.4900. THE COORDINATE VALUES AT SOUTH 8TH STREET = NORTHING 2163237.6800, EASTING 6024596.4500. VERTICAL CONTROL IS BASED ON TIDAL BENCH MARK STATION DISK STAMPED BM 2 1932, DESIGNATION BEING TIDAL 2 STA III 22 DESCRIBED AS A DISK SET VERTICALLY IN THE GRANITE FOUNDATION AT THE NORTHERN MOST ENTRANCE ON THE WEST SIDE OF THE OLD FORD PLANT. THE DISK HAVING A ELEVATION OF 4.902 FEET MEAN LOWER LOW WATER (MLLW).
2. HORIZONTAL CONTROL WAS ESTABLISHED USING THE PREVIOUS SURVEY'S CONTROL MONUMENTS DESIGNATED AS POINTS 1 AND 2.
3. VERTICAL CONTROL WAS ESTABLISHED USING THE ONSITE TEMPORARY BENCH MARK (TBM) DESIGNATED AS POINT 20, BEING THE SW CORNER OF A CONCRETE VAULT WITH AN ELEVATION OF 11.53.
4. POINT #11-3B WAS LOCATED UNDER EQUIPMENT, NORTHING AND EASTING WAS NOT ESTABLISHED. ELEVATION WAS TAKEN AT THE APPROXIMATE LOCATION. (2017 SURVEY)
5. POINTS #11-3B AND #10-3A WERE DESTROYED DURING CONCRETE REPLACEMENT. SET CHISELED CROSSES AT THE APPROXIMATE ORIGINAL LOCATION. (2020 SURVEY)



DILLON & MURPHY
CONSULTING CIVIL ENGINEERS
ENGINEERING • PLANNING • SURVEYING
847 N. CLUFF AVENUE, SUITE A2, LODI, CALIFORNIA 95240 (209) 334-6613

LEVIN RICHMOND TERMINAL

TOPOGRAPHIC SURVEY

RICHMOND, CALIFORNIA
APRIL, 2020

REV. NO.	DESCRIPTION	DATE	SCALE: AS NOTED	BENCH MARK: #20 EL: 11.532	SHEET
			DRAWN BY: SM	DESCRIPTION: SW CORNER OF CONCRETE STRUCTURE FOR SW#7, BASED ON PREVIOUS SURVEY, DONE BY OTHER.	1
			DESIGNED BY:		OF 1 SHEETS
			CHECKED BY: JM		JOB NO. 1749
			AS BUILT BY:		